RESIDENTIAL CHECKLIST

FOOTING / FOUNDATION

- ☐ Permit Site Card posted
- ☐ App plans on job site / Setbacks per plot plan
- ☐ Continuous footing size/depth, per plan
- ☐ Horizontal and Vertical Steel Reinforcing per plan
- ☐ Concrete cover (3" minimum)
- ☐ Concentrated load piers footings per plan

PIER AND FOOTING SIZES

1 (One) Story		
Area	Pier	Footing
50	8" x 16"	1' - 4" x 2' - 0" x 8"
100	8" x 16"	1' - 4" x 2' - 0" x 8"
150	8" x 16"	2' - 0" x 2' - 0" x 8"
200	8" x 16"	2' - 4" x 2' - 4" x 10"
250	—	—
300	—	—

2 (Two) Story		
Area	Pier	Footing
50	8" x 16"	1' - 4" x 2' - 6" x 8"
100	8" x 16"	2' - 0" x 2' - 0" x 10"
150	16" x 16"	2' - 8" x 2' x - 8" x 10"
200	16" x 16"	3' - 0" x 3' - 0" x 10"
250	16" x 16"	3' - 4" x 3' - 4" x 1' - 0"
300	16" x 16"	3' - 8" x 3' - 8" x 1" - 0"

21/2 (Two & one half) Story		
Area	Pier	Footing
50	8" x 16"	1' -4" x 2' -6" x 8"
100	16" x 16"	2' -6" x 2' -6" x 10"
150	16" x 16"	3' -0" x 3' -0" x 10"
200	16" x 16"	3'-11" x 3' -8" x 1'-0"
250	16" x 24"	4' -0" x 4' -0" x 1' -0"
300	16" x 24"	4' -6" x 4' -6" x 1' -0"

BOLTING & STRAPPING FOUNDATIONS'

TYPES OF BOLTS OR STRAPS	BRAND NAME	LOCATION-SPACING
1/2 anchor bolt w/washer (2)	N/A	Within 12" of each corner & 6' o.c.
22 3/4" anchor strap (3,4)	SIMPSON MAB 23	Within 12" of each corner 3' 3' o.c.
22 3/4" anchor strap (3,4)	HUTCH STA 1622	Within 12" of each corner & 2' 9' o.c.
22 3/4" anchor strap (3,4)	HUTCH STA 1822	within 12" of each plate section & 2' 3' o.c.
14 1/2" anchor strap (3,4)	SIMPSON MAB 15	Within 12" of each corner & 3' 3' o.c.
14 1/2" anchor strap (3,4)	HUTCH STA 1614	Within 12" of each corner & 2' 9' o.c.
14 1/2" anchor strap (3,4)	HUTCH STA 1814	Within 12" of ends of each plate section & 2'3' o.c.
6" x 5/8" expansion bolt NOT APPROVED FOR USE IN CLAY BRICK	HILTI Kwik Bolt	Within 12" of each corner & 6' o.c.
1/2" or 5/8" drill In	Simpson Titen HD	Within 12" of each corner & 6' o.c.

1. See Illustration on page 35 in this booklet for Installation locations for above
2. There shall be a minimum of 2 bolts per plate section .
3. Bolts shall extend a minimum of 7" into masonry or concrete.
4. Embedment depth of anchor straps shall be per manufacturer Instructions
5. Fastening schedule are as follows: For Simpson strap anchors, side nailing 2 - 10d x 1 1/2 and 4 - 10d x 1 1/2 nail In top of plate (total). For Hutch strap anchor STA16 (6) 10d on each side (12 total). For anchor STA 18 (4) 10d each side (8 total).

NOTE: It is the responsibility of the permit holder to Install the anchors In accordance with the manufacturer requirements. The above fasteners are approved alternates In Mecklenburg County. Calculations have been given to show these materials equal and/or exceed the minimum code requirements.

PRE-SLAB / INTERIOR BEARING FOOTINGS

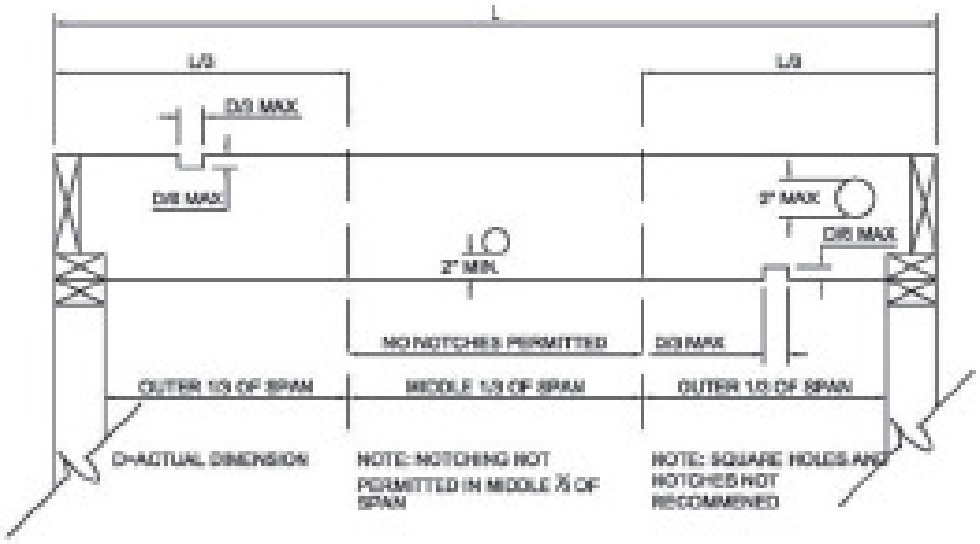
- ☐ Size / depth/ location of footings per plans
- ☐ Steel reinforcing per plans
- ☐ Steel has minimum 3" concrete cover
- ☐ All expansion joints installed per plan
- ☐ Slab thickness (minimum. 3 ½")
- ☐ Copper & plastic piping sleeved
- ☐ No piping parallel and/or embedded within footing

MASONRY WALLS

- ☐ Steel lintel sizing per plans
- ☐ Minimum bearing width @ steel lintels
- ☐ Masonry lintel steel reinforcing size / grade
- ☐ Vertical steel reinforcing per plans
- ☐ Cells solid grouted @ columns

FLOOR FRAMING:

- ☐ Floor beams sized per plans
- ☐ Glu-lam beams identified w/ proper species & camber
- ☐ Glu-lam beams w/ camber not installed upside down
- ☐ Beams supported
- ☐ Notching and drilling of joists



LUMBER SIZES AND THERE ALLOWENCES			
JOIST SIZES	MAX. HOLE	MAX. NOTCH DEPTH	MAX. END NOTCH
2x4	NONE	NONE	NONE
2x6	1 ⅜	7/8	1 3/8
2x8	2 3/8	1 1/4	1 7/8
2x10	3	1 1/2	2 3/8
2x12	3 3/4	1 7/8	2 7/8

FASTENER SCHEDULE FOR STRUCTURAL MEMBERS

DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER a,b,c,d	SPACING OF FASTENERS
Joist to sill or girder, toe nail	3-8d (2-1/2"x 0.113")	—
1" x 6" sub floor or less to each joist, face nail	2-8d (2-1/2"x 0.113") 2 staples, 1 3/4"	
2" sub floor to joist or girder, blind and face nail	(3-1/2"x 0.135") 2-16d	
Sole plate to joist or blocking, face nail	16d (3-1/2"x 0.135")	16" o.c.
Top or sole plate to stud, end nail	2(3-1/2"x 0.135") -16d	
Stud to sole plate, toe nail	3-8d (2-1/2"x 0.113") 2-16d (3-1/2"x 0.135")	
Double studs, face nail	10d (3"x 0.128")	24" o.c.
Double top plates, face nail	10d (3"x 0.128")	24" o.c.
Sole plate to joist or blocking at braced wall panels	3-16d (3-1/2"x 0.135")	16" o.c.
Double top plates, minimum 24-inch offset of end joints, face nail in lapped area	8-16d (3-1/2"x 0.135")	
Blocking between joists or rafters to top plate, toe nail	3-8d (2-1/2"x 0.113")	
Rim joist to top plate, toe nail	8d (2-1/2"x 0.113")	6" o.c.
Top plates, laps at corners and intersections, face nail	2-10d (3"x 0.128")	
Built-up header, two pieces with 1/2" spacer	16d (3-1/2"x 0.135")	16" o.c. along each edge
Continued header, two pieces	16d (3-1/2"x 0.135")	16" o.c. along each edge
Ceiling joists to plate, toe nail	3-8d (3-1/2"x 0.113")	
Continuous header to stud, toe nail	4-8d (2-1/2"x 0.113")	
Ceiling joist, laps over partitions, face nail	3-10d (3"x 0.113")	—

FASTENER SCHEDULE FOR STRUCTURAL MEMBERS

DESCRIPTON OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER a,b,c,d	SPACING OF FASTENER
Ceiling joist to parallel rafters, face nail	3-10d(3"x0.128")	
Rafter to plate, toe nail	2-16d (3-1/2"x0.135")	—
1" brace to each stud and plate, face nail	2-8d (2-1/2"x0.113") 2 staples, 1-1/4"	—
1" x 6" sheathing to each bearing, face nail	2-8d (2-1/2"x0.113") 2 staples, 1-3/4"	—
1 x 8 bearing, face sheathing to each bearing, face nail	2-8d (2-1/2"x0.113") 3 staples, 1-3/4"	—
Wider than 1" x 8" sheathing to each bearing, face nail	3-8d (2-1/2"x0.113") 4 staples, 1-3/4"	
Built-up corner studs	10d(3"x0.128")	24"o.c.
Built-up girders and beams, 2-inch lumber layers	10d (3"x0.128")	Nail each layer as follows: 32" o.c. at top and bottom and staggered. Two nails at ends and at each splice.
2" planks	2-16d	At each bearing
Roof rafters to ridge, valley or hip rafters: toe nail face nail	4-16d (3-1/2x0.135") 3-16d(3-1/2"x0.135")	

- ☐ Web stiffeners installed @ wood I-beam bearing locations, if specified
- ☐ 2x solid blocking, bands or rim joist at ends of floor joists
- ☐ Floor openings framed
- ☐ Second floor bearing walls perpendicular to floor joists not offset more than depth of supporting beams
- ☐ Floor joists under & parallel with second floor bearing walls are doubled
- ☐ Stair stringers sized
- ☐ Stair risers 7 3/4", treads minimum 10" +/- 3/8"
- ☐ Landing depth equal to width of stairs, minimum 36"
- ☐ Minimum 6'8" headroom above stairs
- ☐ All floor openings fire blocked
- ☐ Habitable rooms – no dimension less than 7 ft

Floor Joist Spans for Sleeping areas 30 psf

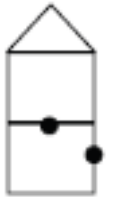
Spacing	species	size	10 psf		20 psf
12	SP#2	2x6	11-3		11-3
		2x8	14-11		14-7
		2x10	19-0		17-9
		2x12	23-0		20-7
	SYP#2	2x6	11-10		11-10
		2x8	15-7		15-7
		2x10	19-10		18-7
		2x12	24-2		21-9
16	SP#2	2x6	10-3		9-11
		2x8	13-6		12-7
		2x10	17-2		15-5
		2x12	19-11		17-10
	SYP#2	2x6	10-9		10-5
		2x8	14-2		13-6
		2x10	18-0		16-1
		2x12	21-1		18-10
24	SP#2	2x6	8-11		8-1
		2x8	11-6		10-3
		2x10	14-1		12-7
		2x12	16-3		14-7
	SYP#2	2x6	9-4		8-6
		2x8	12-4		11-0
		2x10	14-8		13-1
		2x12	17-2		15-5

Floor Joist Spans for 40 psf

			10 psf		20 psf
12	SP#2	2x6	10-3		10-3
		2x8	13-6		13-3
		2x10	17-3		16-3
		2x12	20-7		18-10
	SYP#2	2x6	10-9		10-9
		2x8	14-2		14-2
		2x10	18-0		16-11
		2x12	21-9		19-10
16	SP#2	2x6	9-4		9-1
		2x8	12-3		11-6
		2x10	15-5		14-1
		2x12	17-10		16-3
	SYP#2	2x6	9-9		9-6
		2x8	12-10		12-4
		2x10	16-1		14-8
		2x12	18-10		17-2
24	SP#2	2x6	8-1		7-5
		2x8	10-3		9-5
		2x10	12-7		11-6
		2x12	14-7		13-4
	SYP#2	2x6	8-6		7-9
		2x8	11-0		10-0
		2x10	13-1		12-0
		2x12	15-5		14-0

GIRDER SPANS° AND HEADER SPANS° FOR EXTERIOR BEARING WALLS

(Maximum spans for Douglas fir-larch, hem-fir, southern pine and spruce-pine-fir[b] and required number of jack studs)

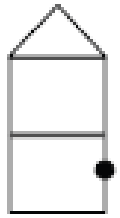
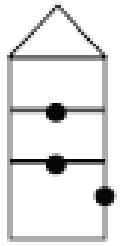
GIRDER AND HEADER SUPPORTS	SIZE	GROUND SNOW LOAD (psf)[e]					
		30					
		Building Width (c) Feet					
		20		28		36	
		Span	NJ (d)	Span	NJ (d)	Span	NJ (d)
Roof and ceiling 	2-2x4	3-6	1	3-2	1	2-10	1
	2-2x6	5-5	1	4-8	1	4-2	1
	2-2x8	6-10	1	5-11	2	5-4	2
	2-2x10	8-5	2	7-3	2	6-6	2
	2-2x12	9-9	2	8-5	2	7-6	2
	3-2x8	8-4	1	7-5	1	6-8	1
	3-2x10	10-6	1	9-1	2	8-2	2
	3-2x12	12-2	2	10-7	2	9-5	2
	4-2x8	7-0	1	6-1	2	5-5	2
	4-2x10	11-8	1	10-6	1	9-5	2
	4-2x12	14-1	1	12-2	2	10-11	2
Roof ceiling and one center-bearing floor 	2-2x4	3-1	1	2-9	1	2-5	1
	2-2x6	4-6	1	4-0	1	3-7	2
	2-2x8	5-9	2	5-0	2	4-6	2
	2-2x10	7-0	2	6-2	2	5-6	2
	2-2x12	8-1	2	7-1	2	6-5	2
	3-2x8	7-2	1	6-3	2	5-8	2
	3-2x10	8-9	2	7-8	2	6-11	2
	3-2x12	10-2	2	8-11	2	8-0	2
	4-2x8	5-10	2	5-2	2	4-8	2
	4-2x10	10-1	1	8-10	2	8-0	2
	4-2x12	11-9	2	10-3	2	9-3	2

continued

Table R502.5(1)

GIRDER SPANS[a] AND HEADER SPANS[a] FOR EXTERIOR BEARING WALLS

(Maximum spans for Douglas fir-larch, hem-fir, southern pine and spruce-pine-fir[c] and required number of jack studs)

GIRDER AND HEADER SUPPORTS	SIZE	GROUND SNOW LOAD (psf)[e]					
		30					
		Building Width (c) Feet					
		20		28		36	
		Span	NJ (d)	Span	NJ (d)	Span	NJ (d)
Roof, ceiling and one clear span floor 	2-2x4	2-8	1	2-4	1	2-1	1
	2-2x6	3-11	1	3-5	2	3-0	2
	2-2x8	5-0	2	4-4	2	3-10	2
	2-2x10	6-1	2	5-3	2	4-8	2
	2-2x12	7-1	2	6-1	3	5-5	3
	3-2x8	6-3	2	5-5	2	4-10	2
	3-2x10	7-7	2	6-7	2	5-11	2
	3-2x12	8-10	2	7-8	2	6-10	2
	4-2x8	5-1	2	4-5	2	3-11	2
	4-2x10	8-9	2	7-7	2	6-10	2
	4-2x12	10-2	2	8-10	2	7-11	2
Roof, ceiling and two center-bearing floors 	2-2x4	2-7	1	2-3	1	2-0	1
	2-2x6	3-9	2	3-3	2	2-11	2
	2-2x8	4-9	2	4-2	2	3-9	2
	2-2x10	5-9	2	5-1	2	4-7	3
	2-2x12	6-8	2	5-10	3	5-3	3
	3-2x8	5-11	2	5-2	2	4-8	2
	3-2x10	7-3	2	6-4	2	5-8	2
	3-2x12	8-5	2	7-4	2	6-7	2
	4-2x8	4-10	2	4-3	2	3-10	2
	4-2x10	8-4	2	7-4	2	6-7	2
	4-2x12	9-8	2	8-6	2	7-8	2

GIRDER SPANS° AND HEADER SPANS° FOR EXTERIOR BEARING WALLS

(Maximum spans for Douglas fir-larch, hem-fir, southern pine and spruce-pine-fir and required number of jack studs)

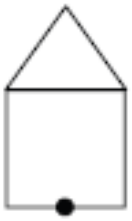
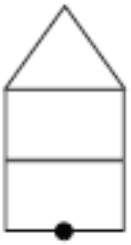
GIRDERS AND HEADER SUPPORTS	SIZE	GROUND SNOW LOAD (psf)e					
		30					
		Building width (c) feet					
		20		28		36	
		Span	NJ (d)	Span	NJ (d)	Span	NJ (d)
Roof, ceiling and two clear span floor	2-2x4	2-1	1	1-8	1	1-6	2
	2-2x6	3-1	2	2-8	2	2-4	2
	2-2x8	3-10	2	3-4	3	3-0	3
	2-2x10	4-9	2	4-1	3	3-8	3
	2-2x12	5-6	3	4-9	3	4-3	3
	3-2x8	4-10	2	4-2	2	3-9	2
	3-2x10	5-11	2	5-1	2	4-7	3
	3-2x12	6-10	2	5-11	3	5-4	3
	4-2x8	5-7	2	4-10	2	4-4	2
	4-2x10	6-10	2	5-11	2	5-3	2
	4-2x12	7-11	2	6-10	2	6-2	3

a. Spans are given in feet and inches.
b. Tabulated values assume #2 grade lumber.
c. Building width is measured perpendicular to the ridge. For widths between those shown, spans are permitted to be interpolated.
d. NJ - Number of jack studs required to support each end. Where the number of required jack studs equals one, the header is permitted to be supported by an approved framing anchor attached to the full-height wall stud and to the header.
e. Use 30 psf ground snow load for cases in which ground snow load is less than 30 psf and the roof live load is equal to or less than 20 psf

Table R502.5(2)

GIRDER SPANS° AND HEADER SPANS° FOR INTERIOR BEARING WALLS

(Maximum spans for Douglas fir-larch, hem-fir, southern pine and spruce-pine-fir and required number of jack studs)

HEADER AND GIRDERS SUPPORTS	SIZE	BUILDING WIDTH(c) FEET					
		20		28		36	
		Span	NJ (d)	Span	NJ (d)	Span	NJ (d)
	2-2x4	3-1	1	2-8	1	2-5	1
	2-2x6	4-6	1	3-11	1	3-6	1
	2-2x8	5-9	1	5-0	2	4-5	2
	2-2x10	7-0	2	6-1	2	5-5	2
	2-2x12	8-1	2	7-0	2	6-3	2
	3-2x8	7-2	1	6-3	1	5-7	2
	3-2x10	8-9	1	7-7	2	6-9	2
	3-2x12	10-2	2	8-10	2	7-10	2
	4-2x8	9-0	1	7-8	1	6-9	1
	4-2x10	10-1	1	8-9	1	7-10	2
	4-2x12	11-9	1	10-2	2	9-1	2
	2-2x4	2-2	1	1-10	1	1-7	1
	2-2x6	3-2	2	2-9	2	2-5	2
	2-2x8	4-1	2	3-6	2	3-2	2
	2-2x10	4-11	2	4-3	2	3-10	3
	2-2x12	5-9	2	5-0	3	4-5	3
	3-2x8	5-1	2	4-5	2	3-11	2
	3-2x10	6-2	2	5-4	2	4-10	2
	3-2x12	7-2	2	6-3	2	5-7	3
	4-2x8	6-1	1	5-3	2	4-8	2
	4-2x10	7-2	2	6-2	2	5-6	2
	4-2x12	8-4	2	7-2	2	6-5	2

a. Spans are given in feet and inches.
b. Tabulated values assume #2 grade lumber.
c. Building width is measured perpendicular to the ridge. For widths between those shown, spans are permitted to be interpolated.
d. NJ - Number of jack studs required to support each end. Where the number of required jack studs equals one, the header is permitted to be supported by an approved framing anchor attached to the full-height wall stud and to the header

NAILING

☐ Proper Structural Sheathing
☐ Approved fasteners (treated wood locations especially)
3”Horizontal
6” Vertical
12” in field of sheathing
☐ Hurricane ties on outside plane of sheathing

PRE-FABRICATED JOISTS & TRUSSES

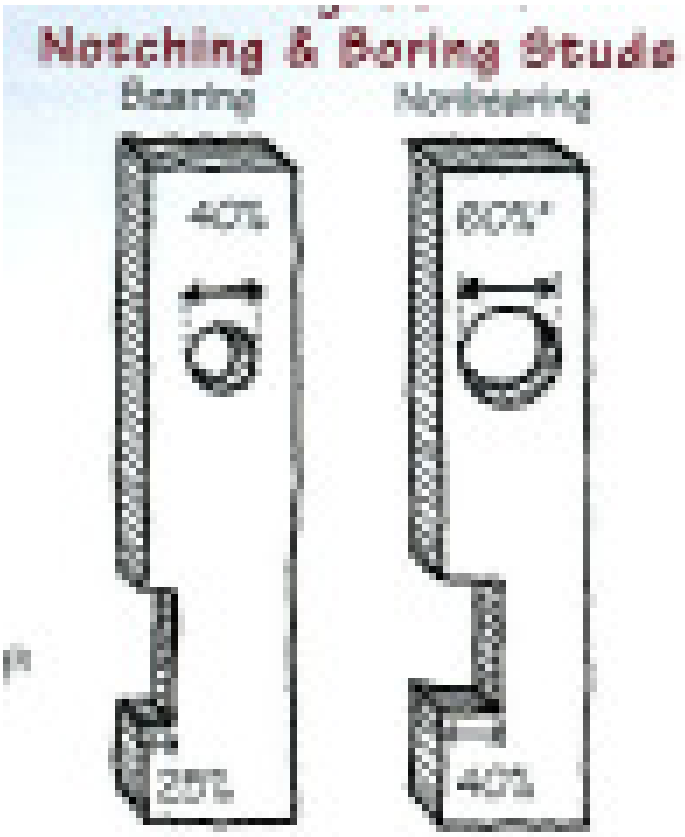
☐ Truss design calcs & layout plan on job site
☐ Design loads per plans Engineer's seal on calculations
☐ Proper hangers used at girder / truss connections
☐ Truss layout/configuration per truss design calcs
☐ Girder trusses have proper # of plies / nailed/bolted per calcs
☐ No cut, notched, drilled, or spliced trusses w/o registrant approval
☐ Lateral web bracing installed per truss calcs
☐ Multiple point bearing trusses have proper support at each bearing pt.
☐ Grade marks match truss calcs
☐ Lumber sizes match truss calcs
☐ Plate connectors match truss calcs
☐ Gable end truss bracing
☐ Eave & gable venting
☐ Truss to truss connections / hangers

ROOF / CEILING FRAMING

☐ Roof joists size/grade/spacing per plan
☐ 1 1/2" minimum bearing widths @ trusses / joists
☐ Solid wood & glue-lam beams sized per plans
☐ All trusses / joists secured to bearing walls & beams
☐ Stubbed trusses have blocking or shear panels between trusses per plan
☐ Gable end sway bracing & ties installed per plan details
☐ Gable end trusses connected to exterior wall per plan details
☐ No cut / damaged / modified pre-fab trusses, girders or beams
☐ Insulation baffles installed at eave vents
☐ 2x solid roof joists have cross-ventilation
☐ Over-framing roof rafters, ridge beam & king posts installed per plan details
☐ Lower roof deck continuous under all over-framing or 2x top chord bracing installed
☐ Provide for minimum 20”x30” finished access opening where attic height >30”
☐ Ceiling joists size, spans per plans
☐ Material / span index
☐ Deck nailing Minimum 8d’s @ 6" OC @ edges, 12" OC @ field
☐ Butt joints spaced 1/8" minimum (Install specs)
☐ Roof vents installed per plans

WALL FRAMING:

☐ Wall studs grade & size
☐ No over height limitations
☐ Interior bearing wall studs @ 16" OC
☐ Exterior walls & interior bearing wall studs have double top plates, splices 24" apart minimum.
☐ Metal tie straps at top plate joints < 24” offset exterior, bearing or shear walls
☐ Hardware at exterior walls & interior bearing studs top & bottom plates per plan
☐ Holes/notches in studs



- ☐ Proper size headers/beams @ all openings per plan
- ☐ Interior shear wall material/blocking/fastening per shear schedule
- ☐ Interior shear wall transfer connections to floor & roof diaphragms per plan details
- ☐ Interior shear wall foundation anchors & hold-downs installed per shear schedule.
- ☐ Interior non-bearing wall studs maximum 24" OC
- ☐ Fire blocking installed at chases, stud bays, top plate openings, etc.
- ☐ Bedroom emergency egress windows per
- ☐ Minimum 36" clear hallway width
- ☐ Minimum Room areas, Ceiling Height 7’6” in habitable rooms
- ☐ Tempered safety glass where required
- ☐ Ext. wall, interior braced or bearing top plates cut >50%, metal tie 11/2” wide with 8-16d nails
- ☐ Frame

CEILING JOIST SPANS FOR COMMON LUMBER SPECIES

(Uninhabitable attics without storage, live load = 10 psf, $L/\Delta = 240$)

CEILING JOIST SPACING (inches)	SPECIES AND GRADE	DEAD LOAD = 10psf			
		2x 4	2x 6	2x 8	2x 10
		Maximum ceiling joist spans			
		(feet-inches)	(feet-inches)	(feet-inches)	(feet-Inches)
12	Southern pine #2	12-5	19-6	25-8	Note a
	Southern pine #3	11-6	17-0	21-8	25-7
	Spruce-pine-fir #2	11-10	18-8	24-7	Note a
	Spruce-pine-fir #3	10-10	15-10	20-1	24-6
16	Southern pine #2	11-3	17-8	23-4	Note a
	Southern pine #3	10-0	14-9	18-9	22-2
	Spruce-pine-fir- #2	10-9	16-11	22-4	Note a
	Spruce-pine-fir #3	9-5	13-9	17-5	21-3
19.2	Southern pine #2	10-7	16-8	21-11	Note a
	Southern pine #3	9-1	13-6	17-2	20-3
	Spruce-pine-fir #2	10-2	15-11	21-0	25-8
	Spruce-pine-fir #3	8-7	12-6	15-10	19-5
24	Southern pine #2	9-10	15-6	20-1	23-11
	Southern pine #3	8-2	12-0	15-4	18-1
	Spruce-pine-fir #2	9-5	14-9	18-9	22-11
	Spruce-pine-fir #3	7-8	11-2	14-2	17-4

a. Span exceeds 26 feet in length.

CEILING JOIST SPANS FOR COMMON LUMBER SPECIES

(Uninhabitable attics with limited storage, live load = 20psf/ L/^=240)

CEILING JOIST SPACING (inches)	SPECIES AND GRADE	DEAD LOAD = 10psf			
		2x 4	2x 6	2x 8	2x 10
		Maximum ceiling joist spans			
		(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)
12	Southern pine #2	9-10	15-6	20-1	23-11
	Southern pine #3	8-2	12-0	15-4	18-1
	Spruce-pine-fir #2	9-5	14-9	18-9	22-11
	Spruce-pine-fir #3	7-8	11-2	14-2	17-4
16	Southern pine #2	8-11	13-6	17-5	20-9
	Southern pine #3	7-1	10-5	13-3	15-8
	Spruce-pine-fir #2	8-7	12-10	16-3	19-10
	Spruce-pine-fir #3	6-8	9-8	12-4	15-0
19.2	Southern pine #2	8-5	12-3	15-10	18-11
	Southern pine #3	6-5	9-6	12-1	14-4
	Spruce-pine-fir #2	8-0	11-9	14-10	18-2
	Spruce-pine-fir #3	6-1	8-10	11-3	13-8
24	Southern pine #2	7-8	11-0	14-2	16-11
	Southern pine #3	5-9	8-6	10-10	12-10
	Spruce-pine-fir #2	7-2	10-6	13-3	16-3
	Spruce-pine-fir #3	5-5	7-11	10-0	12-3

RAFTER SPANS FOR COMMON LUMBER SPECIES

(Roof live load=20 psf, ceiling not attached to rafters, Lie = 180)

RAFTER-SPACING (inches)	SPECIES AND GRADE	DEAD LOAD = 10psf				
		2X 4	2X 6	2X 8	2X 10	2X 12
		Maximum Ceiling Joist Spans				
		(feet-Inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
12	Southern pine #2	10-10	17-0	22-5	Note b	Note b
	Southern pine #3	9-1	13-6	17-2	20-3	24-1
	Spruce-pine-fir #2	10-4	16-3	21-0	25-8	Note b
	Spruce-pine-fir #3	8-7	12-6	15-10	19-5	22-6
16	Southern pine #2	9-10	15-1	19-5	23-2	Note b
	Southern pine #3	7-11	11-8	14-10	17-6	20-11
	Spruce-pine-fir #2	9-5	14-4	18-2	22-3	25-9
	Spruce-pine-fir #3	7-5	10-10	13-9	16-9	19-6
19.2	Southern pine #2	9-3	13-9	17-9	21-2	24-10
	Southern pine #3	7-3	10-8	13-7	16-0	19-1
	Spruce-pine-fir #2	8-10	13-1	16-7	20-3	23-6
	Spruce-pine-fir #3	6-9	9-11	12-7	15-4	17-9
24	Southern-pine #2	8-7	12-3	15-10	18-11	22-2
	Southern pine #3	6-5	9-6	12-1	14-4	17-1
	Spruce-pine-fir #2	8-0	11-9	14-10	18-2	21-0
	Spruce-pine-fir #3	6-1	8-10	11-3	13-8	15-11

b. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. When ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the factors on page 46.

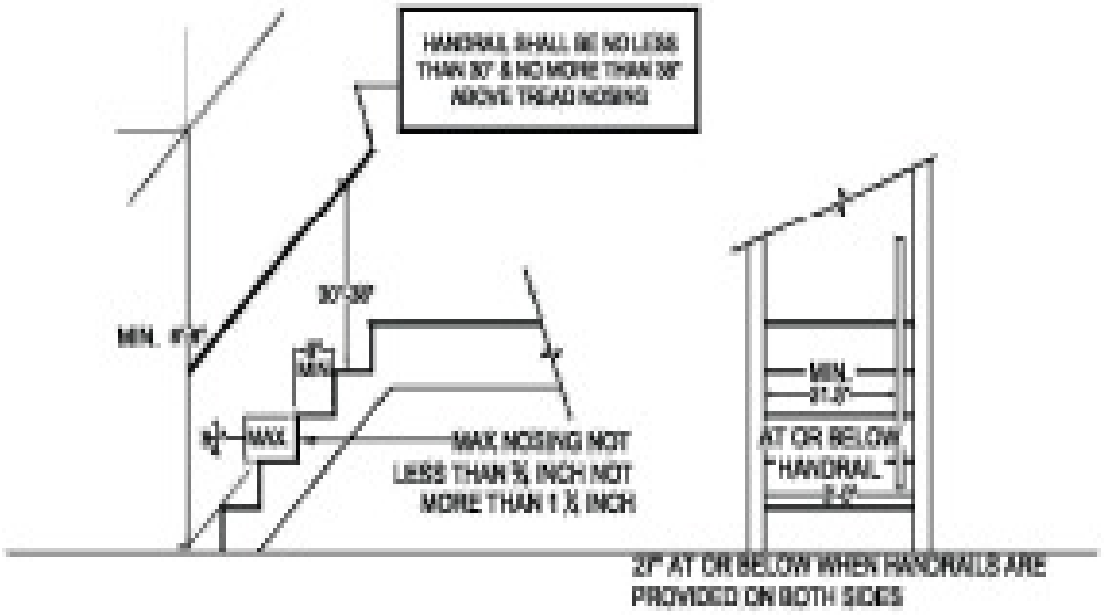
RAFTER SPANS FOR COMMON LUMBER SPECIES

(Roof live load= 20 psf, ceiling attached to rafters, L_k = 240)

RAFTER-SPACING (inches)	SPECIES AND GRADE	DEAD LOAD = 10psf				
		2X 4	2X 6	2X 8	2X 10	2X 12
		Maximum Ceiling Joist Spans				
		(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
12	Southern pine #2	9-10	15-6	20-5	Note b	Note b
	Southern pine #3	9-1	13-6	17-2	20-3	24-1
	Spruce-pine-fir #2	9-5	14-9	19-6	24-10	Note b
	Spruce-pine-fir #3	8-7	12-6	15-10	19-5	22-6
16	Southern pine #2	8-11	14-1	18-6	23-2	Note b
	Southern pine #3	7-11	11-8	14-10	17-6	20-11
	Spruce-pine-fir #2	8-7	13-5	17-9	22-3	25-9
	Spruce-pine-fir #3	7-5	10-10	13-9	16-9	19-6
19.2	Southern pine #2	8-5	13-3	17-5	21-2	24-10
	Southern pine #3	7-3	10-8	13-7	16-0	19-1
	Spruce-pine-fir #2	8-1	12-8	16-7	20-3	23-6
	Spruce-pine-fir #3	6-9	9-11	12-7	15-4	17-9
24	Southern pine #2	7-10	12-3	15-10	18-11	22-2
	Southern pine #3	6-5	9-6	12-1	14-4	17-1
	Spruce-pine-fir #2	7-6	11-9	14-10	18-2	21-0
	Spruce-pine-fir #3	6-1	8-10	11-3	13-8	15-11

b. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. When ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the factors on page 46.

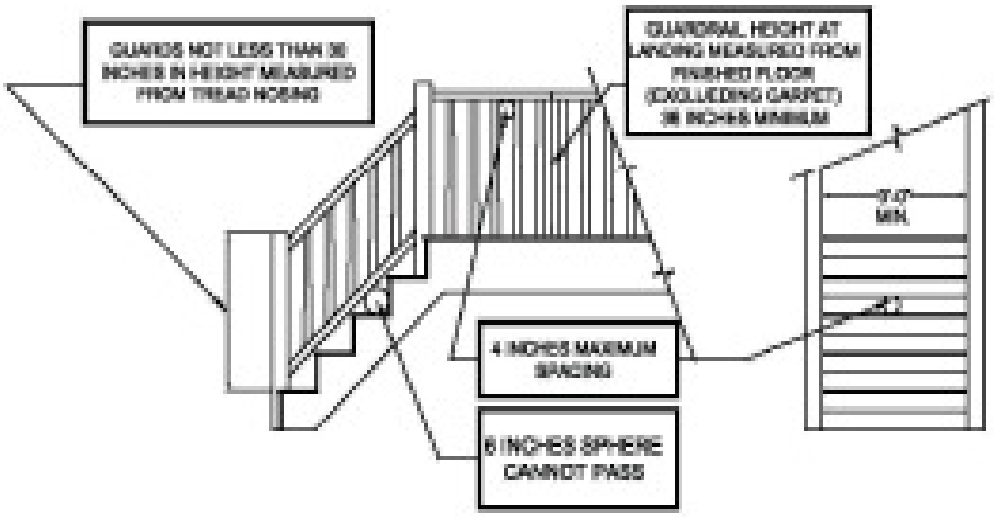
STAIRWAYS



NOTES:

1. THE GREATEST TREAD DEPTH OR THE GREATEST RISER HEIGHT SHALL NOT EXCEED THE SMALLEST BY MORE THAN ⅜ OF AN INCH
2. THE TOP AND BOTTOM RISER OF INTERIOR STAIRS SHALL NOT EXCEED THE SMALLEST RISER WITHIN THAT STAIR RUN BY MORE THAN ⅜ OF AN INCH.
3. THE HEIGHT OF THE TOP AND BOTTOM RISER OF THE INTERIOR STAIRS SHALL BE MEASURED FROM PERMANENT FINISHED SURFACE TO PERMANENT FINISHED SURFACE. (CARPET EXCLUDED)
4. WHERE THE BOTTOM RISER OF AN EXTERIOR STAIR ADJOINS AN EXTERIOR WALK, PORCH, DRIVEWAY, PATIO, OR FINISH GRADE, THE HEIGHT OF THE RISER MAY BE LESS THAN THE HEIGHT OF THE ADJACENT RISER.

HANDRAILS & GUARDRAILS



STAIRS WITH FOUR (4) OR MORE RISERS REQUIRE A HANDRAIL

GUARDRAILS / HANDRAILS: REQUIRED ON ALL PORCHES, BALCONIES OR RIASED FLOOR SURFACES LOCATED MORE THAN 30 INCHES ABOVE THE FLOOR OR GRADE BELOW. GUARDRAILS SHALL NOT BE LESS THAN 36 INCHES IN HEIGHT. OPEN SIDES OF STAIRS WITH A TOTAL RISE OF MORE THAN 30 INCHES ABOVE THE FLOOR OR GRADE BELOW SHALL HAVE GAURDRAILS NOT LESS THAN 34 INCHES NOR MORE THAN 38 INCHES IN HEIGHT MEASURED FROM NOSING OF THE TREADS.

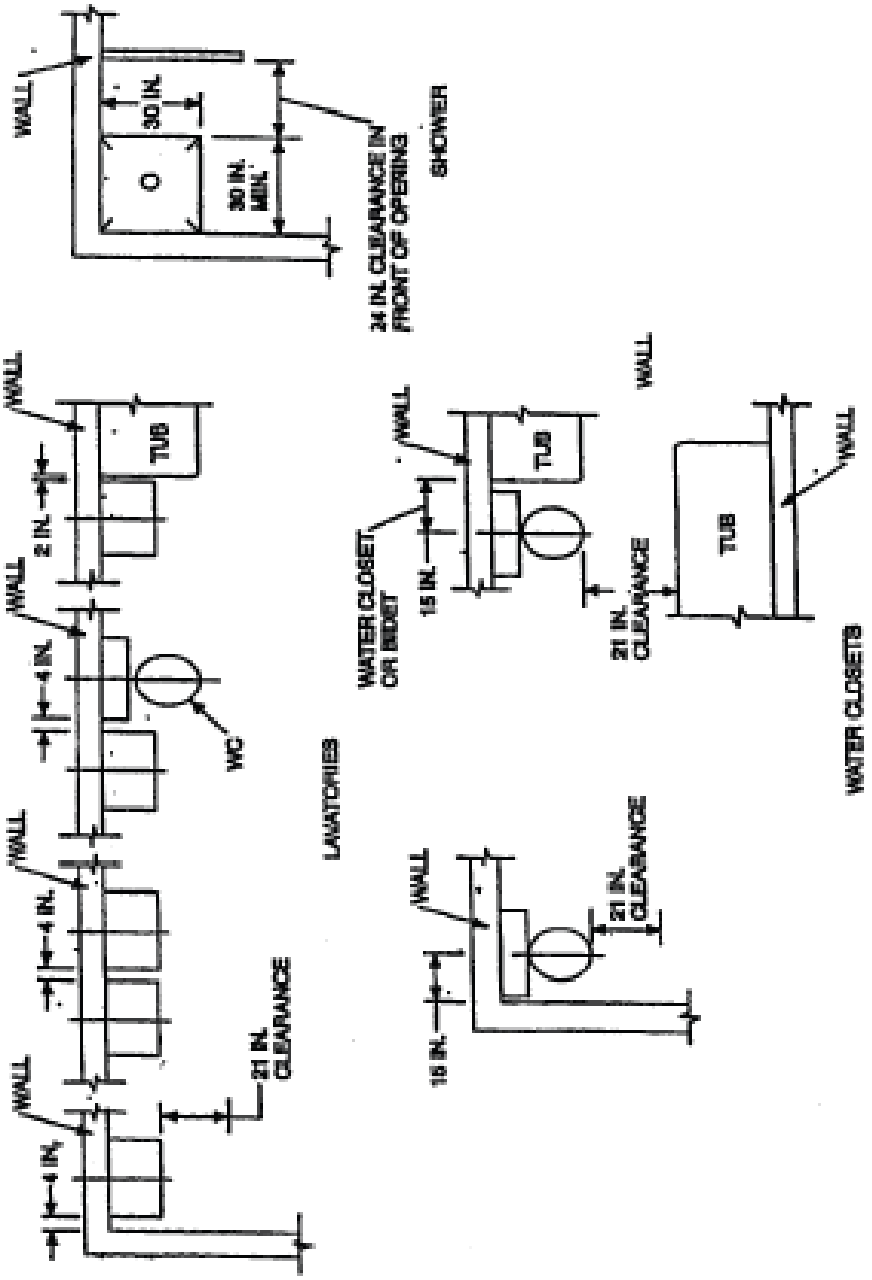
HANDRAIL GRIP SIZE: THE HANDGRIP PORTION OF THE HANDRAILS SHALL NOT BE MORE THAN 2 INCHES IN IN CROSS-SECTIONAL DEMENSION, OR THE SHAPE SHALL PROVIDE AN EQUIVLANT GRIPPING SURFACE. THE HANDGRIP PORTION SHALL SHALL HAVE A SMOOTH SURFACEWITH NO SHARP CORNERS.

Picket Spacing: ON OPEN SIDE OF STAIR TREADS ONLY, PICKETS CAN BE SPACED SUCH THAT A 4 3/8" SPHERE CANNOT PASS THROUGH.

Exterior & Garage handrails.

Exterior handrails (decks, screen porches ,garages ,and areas exposed to weather) shall not be more than 3 1/2" inches in cross section dimension.

PLUMBING FIXTURE CLEARANCE



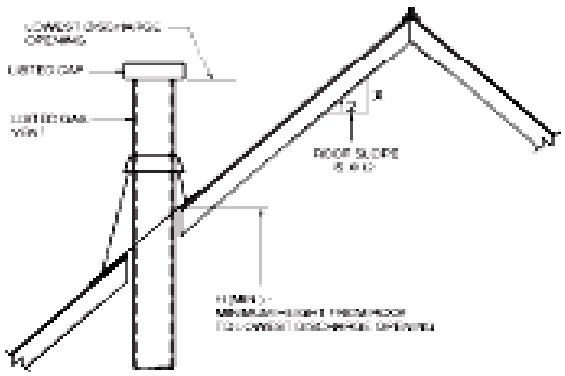
C. MECHANICAL:

- ☐ Attic furnaces supported by truss top chords and installed per mfg installation instructions
- ☐ Attic furnace clearance to combustible material per mfg instructions
- ☐ Provide for minimum 20”x30” finished access opening where necessary
- ☐ Min 24" walkway from access opening to furnace, 20' maximum distance, all edges blocked & nailed
- ☐ Min 30" wide work platform installed full length & in front of furnace & 30" head clearance, all edges blocked & nailed, no obstructions
- ☐ Upper & lower combustion air vents installed if gas appliances installed in confined space, (100" sq in minimum)
- ☐ Attic furnace “B” vent installed per mfg instructions with 1" minimum clearance to combustibles
- ☐ Gravity “B” vents offset maximum 60 degrees from vertical
- ☐ “B” vents have (3) sheet metal screws at appliance collar connection
- ☐ “B” vents horizontal length maximum 75% vertical length
- ☐ “B” vents terminate 8' horizontal from wall, & minimum 12" above roof if < 12" diameter
- ☐ Attic A-coil drain pan installed and sloped to secondary drain outlet
- ☐ Primary condensate drain trapped & vented, sloped 1/8" per ft & supported 48" OC maximum & terminates in readily accessible location
- ☐ Secondary condensate sloped 1/8" per ft & supported 48" OC & terminates above primary
- ☐ A/C refrigerant lines insulated
- ☐ All supply & return air ducts sized & installed per plans
- ☐ Metallic supply duct insulated in attic spaces
- ☐ Maximum 1/2" / ft sag between supports for flexduct per installation Instructions
- ☐ All NM flex supply & return duct connections to rigid collars have band connectors and proper tape
- ☐ Metallic flex ducts supported 48”oc with 1 ½” straps
- ☐ All joints for metallic ducts have minimum (3) sheet metal screws (except dryer vent)
- ☐ Exhaust fans installed in bathrooms & toilet rooms (or 1.5 sq ft natural ventilation)
- ☐ Bathroom exhaust fans sized 50 cfm minimum.
- ☐ Minimum 4" dryer vent per manf. Instr.35’ maximum; elbows reduce
- ☐ Insulation barrier shaft minimum 24” in height provided at all B vents in insulated areas.
- ☐ Makeup air for clothes dryers
- ☐ Combustion air gas dryers

[M] TABLE 614.6.5.1
DRYER EXHAUST DUCT FITTING EQUIVALENT LENGTH

DRYER EXHAUST DUCT FITTING TYPE	EQUIVALENT LENGTH
4 inch radius mitered 45-degree elbow	2 feet, 6 inches
4 inch radius mitered 90-degree elbow	5 feet
6 inch radius smooth 45-degree elbow	1 foot
6 inch radius smooth 90-degree elbow	1 foot, 9 inches
8 inch radius smooth 45-degree elbow	1 foot
8 inch radius smooth 90-degree elbow	1 foot, 7 inches
10 inch radius smooth 45-degree elbow	9 inches
10 inch radius smooth 90-degree elbow	1 foot, 6 inches

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 degree = 0.01745 rad.



ROOF SLOPE	H (min) ft
Flat to 6/12	1.0
Over 6/12 to 7/12	1.25
Over 7/12 to 8/12	1.5
Over 8/12 to 9/12	2.0
Over 9/12 to 10/12	2.5
Over 10/12 to 11/12	3.25
Over 11/12 to 12/12	4.0
Over 12/12 to 14/12	5.0
Over 14/12 to 16/12	6.0
Over 16/12 to 18/12	7.0
Over 18/12 to 20/12	7.5
Over 20/12 to 21/12	8.0

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

FIGURE 503.6.4
TERMINATION LOCATIONS FOR GAS VENTS WITH LISTED CAPS 12 INCHES OR LESS IN SIZE AT LEAST 8 FEET FROM A VERTICAL WALL

GAS:

☐ Under slab gas line sleeved & vented per Approved detail
☐ Labeling of gas line (5' intervals) yellow sticker with black letters
☐ Paint Exterior Steel Piping
☐ Sediment Traps
☐ Shut off valves
☐ Regulator placement and vent limiter
☐ Gas line minimum 10 psi air pressure test 10 minutes
☐ Gas piping supports: (Horizontal)1/2" = 6 ft OC maximum 3/4" or 1"= 8 ft OC maximum 1 1/4" or larger = 10 ft OC maximum
☐ Gas S.O.V. within not less than 6ft & in the same room of all appliances except range (6ft)
☐ 18" high platforms for all appliances with ignition source within garage
☐ All hot water heaters in garage have vehicle protection or out of path
☐ Carbon Monoxide Detectors

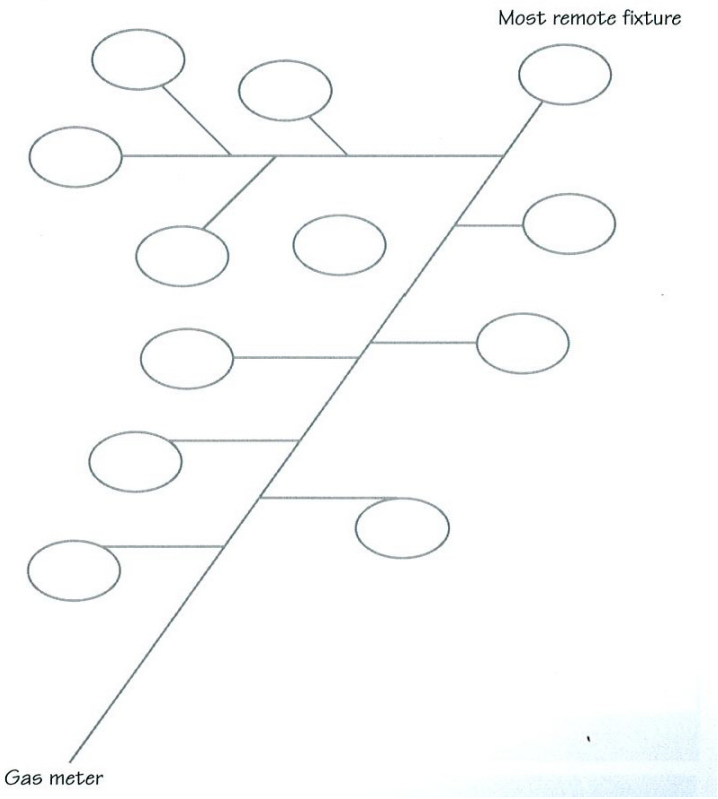


TABLE 402.2
APPROXIMATE GAS INPUT FOR TYPICAL APPLIANCES

APPLIANCE	INPUT BTU/H (Approx.)
Space Heating Units	
Hydronic boiler	
Single family	100,000
Multifamily, per unit	60,000
Warm-air furnace	
Single family	100,000
Multifamily, per unit	60,000
Space and Water Heating Units	
Hydronic boiler	
Single family	120,000
Multifamily, per unit	75,000
Water Heating Appliances	
Water heater, automatic instantaneous	
Capacity at 2 gal./minute	142,800
Capacity at 4 gal./minute	285,000
Capacity at 6 gal./minute	428,400
Water heater, automatic storage, 30- to 40-gal. tank	35,000
Water heater, automatic storage, 50-gal. tank	50,000
Water heater, domestic, circulating or side-arm	35,000
Cooking Appliances	
Built-in oven or broiler unit, domestic	25,000
Built-in top unit, domestic	40,000
Range, free-standing, domestic	65,000
Other Appliances	
Barbecue	40,000
Clothes dryer, Type 1 (domestic)	35,000
Gas fireplace, direct-vent	40,000
Gas light	2,500
Gas log	80,000
Refrigerator	3,000

For SI: 1 British thermal unit per hour = 0.293 W, 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m.

TABLE 415.1
SUPPORT OF PIPING

STEEL PIPE, NOMINAL SIZE OF PIPE (Inches)	SPACING OF SUPPORTS (feet)	NOMINAL SIZE OF TUBING (SMOOTH-WALL) (Inch O.D.)	SPACING OF SUPPORTS (feet)
1/2	6	1/2	4
3/4 or 1	8	5/8 or 3/4	6
1 1/4 or larger (horizontal)	10	7/8 or 1 (horizontal)	8
1 1/4 or larger (vertical)	Every floor level	1 or larger (vertical)	Every floor level

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

PIPE SIZE (inch)														
Nominal	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	10	12
Actual ID	0.622	0.824	1.049	1.380	1.610	2.067	2.469	3.068	4.026	5.047	6.065	7.981	10.020	11.938
Length (ft)	Capacity in Cubic Feet of Gas Per Hour													
10	172	360	678	1,390	2,090	4,020	6,400	11,300	23,100	41,800	67,600	139,000	252,000	399,000
20	118	247	466	957	1,430	2,760	4,400	7,780	15,900	28,700	46,500	95,500	173,000	275,000
30	95	199	374	768	1,150	2,220	3,530	6,250	12,700	23,000	37,300	76,700	139,000	220,000
40	81	170	320	657	985	1,900	3,020	5,350	10,900	19,700	31,900	65,600	119,000	189,000
50	72	151	284	583	873	1,680	2,680	4,740	9,660	17,500	28,300	58,200	106,000	167,000
60	65	137	257	528	791	1,520	2,430	4,290	8,760	15,800	25,600	52,700	95,700	152,000
70	60	126	237	486	728	1,400	2,230	3,950	8,050	14,600	23,600	48,500	88,100	139,000
80	56	117	220	452	677	1,300	2,080	3,670	7,490	13,600	22,000	45,100	81,900	130,000
90	52	110	207	424	635	1,220	1,950	3,450	7,030	12,700	20,600	42,300	76,900	122,000
100	50	104	195	400	600	1,160	1,840	3,260	6,640	12,000	19,500	40,000	72,600	115,000
125	44	92	173	355	532	1,020	1,630	2,890	5,890	10,600	17,200	35,400	64,300	102,000
150	40	83	157	322	482	928	1,480	2,610	5,330	9,650	15,600	32,100	58,300	92,300
175	37	77	144	296	443	854	1,360	2,410	4,910	8,880	14,400	29,500	53,600	84,900
200	34	71	134	275	412	794	1,270	2,240	4,560	8,260	13,400	27,500	49,900	79,000
250	30	63	119	244	366	704	1,120	1,980	4,050	7,320	11,900	24,300	44,200	70,000
300	27	57	108	221	331	638	1,020	1,800	3,670	6,630	10,700	22,100	40,100	63,400
350	25	53	99	203	305	587	935	1,650	3,370	6,100	9,880	20,300	36,900	58,400
400	23	49	92	189	283	546	870	1,540	3,140	5,680	9,190	18,900	34,300	54,300
450	22	46	86	177	266	512	816	1,440	2,940	5,330	8,620	17,700	32,200	50,900
500	21	43	82	168	251	484	771	1,360	2,780	5,030	8,150	16,700	30,400	48,100

TABLE 402.4(3)
SCHEDULE 40 METALLIC PIPE

Inlet Pressure	2.0 psi
Pressure Drop	1.0 psi
Specific Gravity	0.60

PIPE SIZE (inch)									
Nominal	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
Actual ID	0.622	0.824	1.049	1.380	1.610	2.067	2.469	3.068	4.026
Length (ft)	Capacity in Cubic Feet of Gas Per Hour								
10	1,510	3,040	5,560	11,400	17,100	32,900	52,500	92,800	189,000
20	1,070	2,150	3,930	8,070	12,100	23,300	37,100	65,600	134,000
30	869	1,760	3,210	6,590	9,880	19,000	30,300	53,600	109,000
40	753	1,520	2,780	5,710	8,550	16,500	26,300	46,400	94,700
50	673	1,360	2,490	5,110	7,650	14,700	23,500	41,500	84,700
60	615	1,240	2,270	4,660	6,980	13,500	21,400	37,900	77,300
70	569	1,150	2,100	4,320	6,470	12,500	19,900	35,100	71,600
80	532	1,080	1,970	4,040	6,050	11,700	18,600	32,800	67,000
90	502	1,010	1,850	3,810	5,700	11,000	17,500	30,900	63,100
100	462	934	1,710	3,510	5,260	10,100	16,100	28,500	58,200
125	414	836	1,530	3,140	4,700	9,060	14,400	25,500	52,100
150	372	751	1,370	2,820	4,220	8,130	13,000	22,900	46,700
175	344	695	1,270	2,601	3,910	7,530	12,000	21,200	43,300
200	318	642	1,170	2,410	3,610	6,960	11,100	19,600	40,000
250	279	583	1,040	2,140	3,210	6,180	9,850	17,400	35,500
300	253	528	945	1,940	2,910	5,600	8,920	15,800	32,200
350	232	486	869	1,790	2,670	5,150	8,210	14,500	29,600
400	216	452	809	1,660	2,490	4,790	7,640	13,500	27,500
450	203	424	759	1,560	2,330	4,500	7,170	12,700	25,800
500	192	401	717	1,470	2,210	4,250	6,770	12,000	24,400

TABLE 402.4(7)
SEMIRIGID COPPER TUBING

Inlet Pressure	Less than 2 psi
Pressure Drop	0.5 in. w.c.
Specific Gravity	0.60

TUBE SIZE (inch)										
Nominal	K & L	1/4	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	2
	ACR	3/8	1/2	5/8	3/4	7/8	1 1/8	1 3/8	—	—
Outside		0.375	0.500	0.625	0.750	0.875	1.125	1.375	1.625	2.125
Inside		0.305	0.402	0.527	0.652	0.745	0.995	1.245	1.481	1.959
Length (ft)		Capacity in Cubic Feet of Gas Per Hour								
10		27	55	111	195	276	590	1,060	1,680	3,490
20		18	38	77	134	190	406	730	1,150	2,400
30		15	30	61	107	152	326	586	925	1,930
40		13	26	53	92	131	279	502	791	1,650
50		11	23	47	82	116	247	445	701	1,460
60		10	21	42	74	105	224	403	635	1,320
70		NA	19	39	68	96	206	371	585	1,220
80		NA	18	36	63	90	192	345	544	1,130
90		NA	17	34	59	84	180	324	510	1,060
100		NA	16	32	56	79	170	306	482	1,000
125		NA	14	28	50	70	151	271	427	890
150		NA	13	26	45	64	136	245	387	806
175		NA	12	24	41	59	125	226	356	742
200		NA	11	22	39	55	117	210	331	690
250		NA	NA	20	34	48	103	186	294	612
300		NA	NA	18	31	44	94	169	266	554
350		NA	NA	16	28	40	86	155	245	510
400		NA	NA	15	26	38	80	144	228	474
450		NA	NA	14	25	35	75	135	214	445
500		NA	NA	13	23	33	71	128	202	420

TABLE 402.4(10)
SEMIRIGID COPPER TUBING

Inlet Pressure	2.0 psi
Pressure Drop	1.0 psi
Specific Gravity	0.60

TUBE SIZE (inch)										
Nominal	K & L	1/4	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	2
	ACR	3/8	1/2	5/8	3/4	7/8	1 1/8	1 3/8	—	—
Outside		0.375	0.500	0.625	0.750	0.875	1.125	1.375	1.625	2.125
Inside		0.305	0.402	0.527	0.652	0.745	0.995	1.245	1.481	1.959
Length (ft)		Capacity in Cubic Feet of Gas Per Hour								
10		245	506	1,030	1,800	2,550	5,450	9,820	15,500	32,200
20		169	348	708	1,240	1,760	3,750	6,750	10,600	22,200
30		135	279	568	993	1,410	3,010	5,420	8,550	17,800
40		116	239	486	850	1,210	2,580	4,640	7,310	15,200
50		103	212	431	754	1,070	2,280	4,110	6,480	13,500
60		93	192	391	683	969	2,070	3,730	5,870	12,200
70		86	177	359	628	891	1,900	3,430	5,400	11,300
80		80	164	334	584	829	1,770	3,190	5,030	10,500
90		75	154	314	548	778	1,660	2,990	4,720	9,820
100		71	146	296	518	735	1,570	2,830	4,450	9,280
125		63	129	263	459	651	1,390	2,500	3,950	8,220
150		57	117	238	416	590	1,260	2,270	3,580	7,450
175		52	108	219	383	543	1,160	2,090	3,290	6,850
200		49	100	204	356	505	1,080	1,940	3,060	6,380
250		43	89	181	315	448	956	1,720	2,710	5,650
300		39	80	164	286	406	866	1,560	2,460	5,120
350		36	74	150	263	373	797	1,430	2,260	4,710
400		33	69	140	245	347	741	1,330	2,100	4,380
450		31	65	131	230	326	696	1,250	1,970	4,110
500		30	61	124	217	308	657	1,180	1,870	3,880

TABLE 402.4(13)
CORRUGATED STAINLESS STEEL TUBING (CSST)

Inlet Pressure	Less than 2 psi
Pressure Drop	0.5 in. w.c.
Specific Gravity	0.60

TUBE SIZE (EHD)														
Flow Designation	13	15	18	19	23	25	30	31	37	39	46	48	60	62
Length (ft)	Capacity in Cubic Feet of Gas Per Hour													
5	46	63	115	134	225	270	471	546	895	1,037	1,790	2,070	3,660	4,140
10	32	44	82	95	161	192	330	383	639	746	1,260	1,470	2,600	2,930
15	25	35	66	77	132	157	267	310	524	615	1,030	1,200	2,140	2,400
20	22	31	58	67	116	137	231	269	456	536	888	1,050	1,850	2,080
25	19	27	52	60	104	122	206	240	409	482	793	936	1,660	1,860
30	18	25	47	55	96	112	188	218	374	442	723	856	1,520	1,700
40	15	21	41	47	83	97	162	188	325	386	625	742	1,320	1,470
50	13	19	37	42	75	87	144	168	292	347	559	665	1,180	1,320
60	12	17	34	38	68	80	131	153	267	318	509	608	1,080	1,200
70	11	16	31	36	63	74	121	141	248	295	471	563	1,000	1,110
80	10	15	29	33	60	69	113	132	232	277	440	527	940	1,040
90	10	14	28	32	57	65	107	125	219	262	415	498	887	983
100	9	13	26	30	54	62	101	118	208	249	393	472	843	933
150	7	10	20	23	42	48	78	91	171	205	320	387	691	762
200	6	9	18	21	38	44	71	82	148	179	277	336	600	661
250	5	8	16	19	34	39	63	74	133	161	247	301	538	591
300	5	7	15	17	32	36	57	67	95	148	226	275	492	540

TABLE 402.4(16)
CORRUGATED STAINLESS STEEL TUBING (CSST)

Inlet Pressure	2.0 psi
Pressure Drop	1.0 psi
Specific Gravity	0.60

	TUBE SIZE (EHD)													
Flow Designation	13	15	18	19	23	25	30	31	37	39	46	48	60	62
Length (ft)	Capacity in Cubic Feet of Gas Per Hour													
10	270	353	587	700	1,100	1,370	2,590	2,990	4,510	5,037	9,600	10,700	18,600	21,600
25	166	220	374	444	709	876	1,620	1,870	2,890	3,258	6,040	6,780	11,900	13,700
30	151	200	342	405	650	801	1,480	1,700	2,640	2,987	5,510	6,200	10,900	12,500
40	129	172	297	351	567	696	1,270	1,470	2,300	2,605	4,760	5,380	9,440	10,900
50	115	154	266	314	510	624	1,140	1,310	2,060	2,343	4,260	4,820	8,470	9,720
75	93	124	218	257	420	512	922	1,070	1,690	1,932	3,470	3,950	6,940	7,940
80	89	120	211	249	407	496	892	1,030	1,640	1,874	3,360	3,820	6,730	7,690
100	79	107	189	222	366	445	795	920	1,470	1,685	3,000	3,420	6,030	6,880
150	64	87	155	182	302	364	646	748	1,210	1,389	2,440	2,800	4,940	5,620
200	55	75	135	157	263	317	557	645	1,050	1,212	2,110	2,430	4,290	4,870
250	49	67	121	141	236	284	497	576	941	1,090	1,890	2,180	3,850	4,360
300	44	61	110	129	217	260	453	525	862	999	1,720	1,990	3,520	3,980
400	38	52	96	111	189	225	390	453	749	871	1,490	1,730	3,060	3,450
500	34	46	86	100	170	202	348	404	552	783	1,330	1,550	2,740	3,090

TABLE 402.4(23)
SCHEDULE 40 METALLIC PIPE

Gas	Undiluted Propane
Inlet Pressure	10.0 psi
Pressure Drop	1.0 psi
Specific Gravity	1.50

INTENDED USE	Pipe sizing between first stage (high-pressure regulator) and second stage (low-pressure regulator).								
	PIPE SIZE (inch)								
Nominal	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
Actual ID	0.622	0.824	1.049	1.380	1.610	2.067	2.469	3.068	4.026
Length (ft)	Capacity in Thousands of Btu per Hour								
10	3,320	6,950	13,100	26,900	40,300	77,600	124,000	219,000	446,000
20	2,280	4,780	9,000	18,500	27,700	53,300	85,000	150,000	306,000
30	1,830	3,840	7,220	14,800	22,200	42,800	68,200	121,000	246,000
40	1,570	3,280	6,180	12,700	19,000	36,600	58,400	103,000	211,000
50	1,390	2,910	5,480	11,300	16,900	32,500	51,700	91,500	187,000
60	1,260	2,640	4,970	10,200	15,300	29,400	46,900	82,900	169,000
70	1,160	2,430	4,570	9,380	14,100	27,100	43,100	76,300	156,000
80	1,080	2,260	4,250	8,730	13,100	25,200	40,100	70,900	145,000
90	1,010	2,120	3,990	8,190	12,300	23,600	37,700	66,600	136,000
100	956	2,000	3,770	7,730	11,600	22,300	35,600	62,900	128,000
125	848	1,770	3,340	6,850	10,300	19,800	31,500	55,700	114,000
150	768	1,610	3,020	6,210	9,300	17,900	28,600	50,500	103,000
175	706	1,480	2,780	5,710	8,560	16,500	26,300	46,500	94,700
200	657	1,370	2,590	5,320	7,960	15,300	24,400	43,200	88,100
250	582	1,220	2,290	4,710	7,060	13,600	21,700	38,300	78,100
300	528	1,100	2,080	4,270	6,400	12,300	19,600	34,700	70,800
350	486	1,020	1,910	3,930	5,880	11,300	18,100	31,900	65,100
400	452	945	1,780	3,650	5,470	10,500	16,800	29,700	60,600
450	424	886	1,670	3,430	5,140	9,890	15,800	27,900	56,800
500	400	837	1,580	3,240	4,850	9,340	14,900	26,300	53,700

TABLE 402.4(26)
SCHEDULE 40 METALLIC PIPE

Gas	Undiluted Propane
Inlet Pressure	11.0 in. w.c.
Pressure Drop	0.5 in. w.c.
Specific Gravity	1.50

INTENDED USE	Pipe sizing between single- or second-stage (low pressure) regulator and appliance.								
	PIPE SIZE (inch)								
Nominal	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
Actual ID	0.622	0.824	1.049	1.380	1.610	2.067	2.469	3.068	4.026
Length (ft)	Capacity in Thousands of Btu per Hour								
10	291	608	1,150	2,350	3,520	6,790	10,800	19,100	39,000
20	200	418	787	1,620	2,420	4,660	7,430	13,100	26,800
30	160	336	632	1,300	1,940	3,750	5,970	10,600	21,500
40	137	287	541	1,110	1,660	3,210	5,110	9,030	18,400
50	122	255	480	985	1,480	2,840	4,530	8,000	16,300
60	110	231	434	892	1,340	2,570	4,100	7,250	14,800
80	101	212	400	821	1,230	2,370	3,770	6,670	13,600
100	94	197	372	763	1,140	2,200	3,510	6,210	12,700
125	89	185	349	716	1,070	2,070	3,290	5,820	11,900
150	84	175	330	677	1,010	1,950	3,110	5,500	11,200
175	74	155	292	600	899	1,730	2,760	4,880	9,950
200	67	140	265	543	814	1,570	2,500	4,420	9,010
250	62	129	243	500	749	1,440	2,300	4,060	8,290
300	58	120	227	465	697	1,340	2,140	3,780	7,710
350	51	107	201	412	618	1,190	1,900	3,350	6,840
400	46	97	182	373	560	1,080	1,720	3,040	6,190
450	42	89	167	344	515	991	1,580	2,790	5,700
500	40	83	156	320	479	922	1,470	2,600	5,300

TABLE 402.4(28)
SEMIRIGID COPPER TUBING

Gas	Undiluted Propane
Inlet Pressure	11.0 in. w.c.
Pressure Drop	0.5 in. w.c.
Specific Gravity	1.50

INTENDED USE		Sizing between single or second stage (low-pressure regulator) and appliance.								
		TUBE SIZE (inch)								
Nominal	K & L	1/4	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	2
	ACR	3/8	1/2	5/8	3/4	7/8	1 1/8	1 3/8	—	—
Outside		0.375	0.500	0.625	0.750	0.875	1.125	1.375	1.625	2.125
Inside		0.305	0.402	0.527	0.652	0.745	0.995	1.245	1.481	1.959
Length (ft)		Capacity in Thousands of Btu per Hour								
10		45	93	188	329	467	997	1,800	2,830	5,890
20		31	64	129	226	321	685	1,230	1,950	4,050
30		25	51	104	182	258	550	991	1,560	3,250
40		21	44	89	155	220	471	848	1,340	2,780
50		19	39	79	138	195	417	752	1,180	2,470
60		17	35	71	125	177	378	681	1,070	2,240
70		16	32	66	115	163	348	626	988	2,060
80		15	30	61	107	152	324	583	919	1,910
90		14	28	57	100	142	304	547	862	1,800
100		13	27	54	95	134	287	517	814	1,700
125		11	24	48	84	119	254	458	722	1,500
150		10	21	44	76	108	230	415	654	1,360
175		NA	20	40	70	99	212	382	602	1,250
200		NA	18	37	65	92	197	355	560	1,170
250		NA	16	33	58	82	175	315	496	1,030
300		NA	15	30	52	74	158	285	449	936
350		NA	14	28	48	68	146	262	414	861
400		NA	13	26	45	63	136	244	385	801
450		NA	12	24	42	60	127	229	361	752
500		NA	11	23	40	56	120	216	341	710

PLUMBING:

SEWER:
☐ Material & size 4” minimum
☐ Minimum slope
☐ Proper transition glue/fitting
☐ Exterior two-way cleanout
☐ Additional cleanouts as needed
☐ Sand or clean soil bedding

WATER SERVICE:
☐ Proper water service line size
☐ Proper fittings and/or glue
☐ Sand or clean soil bedding
☐ Sleeved at all trench cross-over’s

Under Slab:
☐ 10' Head pressure test
☐ Minimum slope
☐ Sand or clean soil bedding
☐ Cleanouts
☐ Maximum 6 F.U.'S @ 2" horizontal drain
☐ Proper sweep @ all fittings
☐ Proper length of trap arms
1. Minimum 2x dia
2. 5' maximum (1 1/2")
3. 8' maximum (2")
4. 12' maximum (3")
☐ All piping properly protected

WATER DISTRIBUTION:
☐ Cold water branch sizing
☐ Hot water branch sizing
☐ Sand or clean soil bedding
☐ Tested at operating pressure or 100 psi minimum for minimum 15 minutes with proper gauge
☐ Copper protected @ all cross-over
☐ No kinked / damaged copper
☐ Copper sleeved
☐ No copper within pier footings
☐ Waste & vent lines under 10' head test or 5 lb psi air test
☐ Water heater T & P drain installed & sloped to flow by gravity to exterior
☐ All branch cold & hot water lines sized Maximum 6 FU’s on 1/2" branch
☐ All water & drainage lines protected at wall studs & top & bottom plates where 1.5 wood
☐ All copper piping < 1 ¼”supported 6 ft OC maximum and secured to wall studs at each fixture connection
☐ All plastic piping supported
☐ All copper protected at exterior wall penetrations & where in contact with dissimilar metallic materials
☐ 1 1/2" trap arms maximum 3'6" length
☐ 2" trap arms maximum 5'0" length
☐ 3" trap arms maximum 6'0" length
☐ Maximum 90 degree offset for trap arms < 3"
☐ Proper sweep of fittings for drainage
☐ No vents offset horizontally below pt 6" above flood level
☐ Island vents extend vertically minimum to drain board height

- ☐ All hose bibs have vacuum breakers
- ☐ Minimum 30" clear width at water closets, 15" to center and & 21" in front
- ☐ All exterior sill plate cut-outs grouted/sealed
- ☐ All concrete floor openings for p-traps grouted
- ☐ All tub/shower enclosures installed w/2x blocking at flanges
- ☐ All tub/shower mixing valves & shower head supply installed & under test
- ☐ Approved screws used at water closet flange and no off-set flanges
- ☐ All wood floor openings fire-blocked with drywall

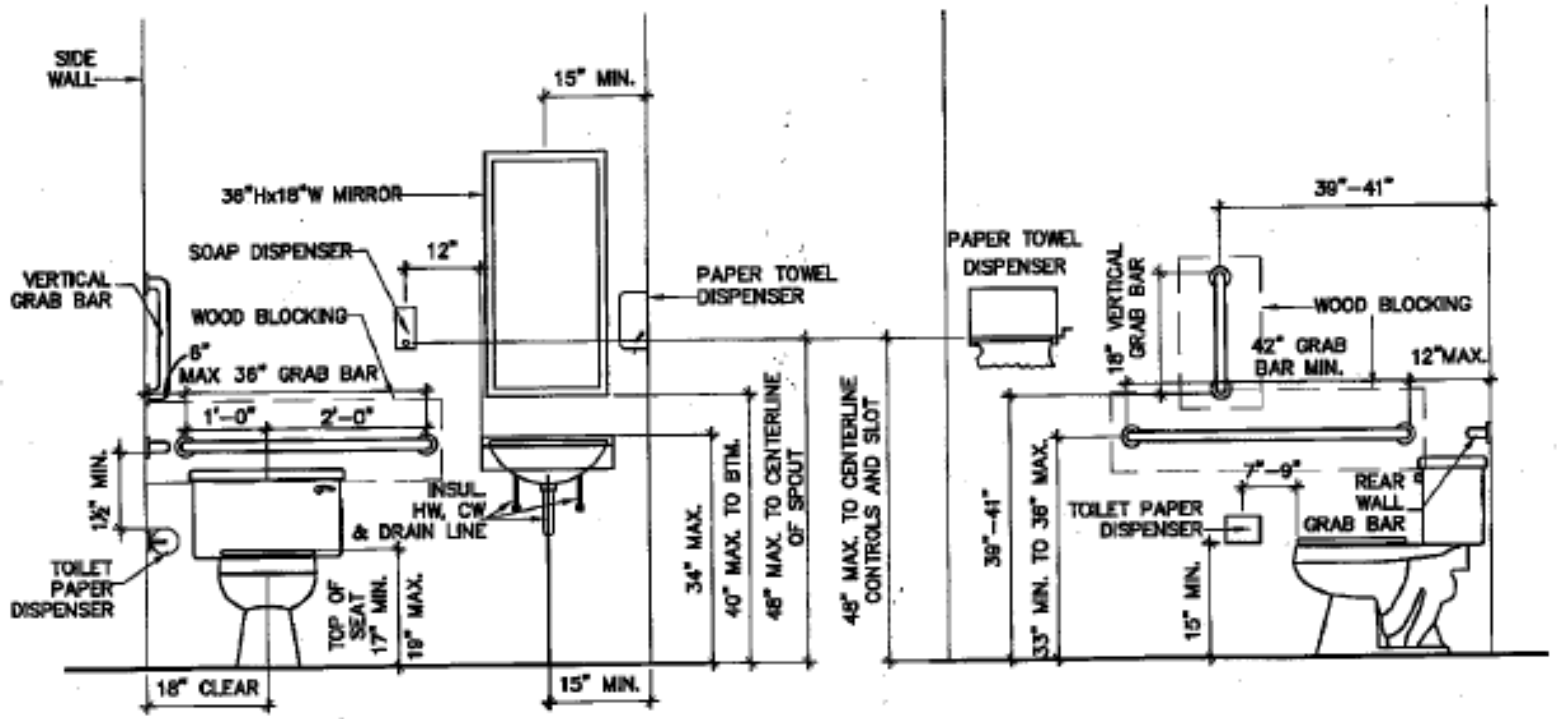
WATER SERVICE PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe	ASTM D 1527; ASTM D 2282
Asbestos-cement pipe	ASTM C 296
Brass pipe	ASTM B 43
Chlorinated polyvinyl chloride (CPVC) plastic pipe	ASTM D 2846; ASTM F 441; ASTM F 442; CSA B137.6
Copper or copper-alloy pipe	ASTM B 42; ASTM B 302
Copper or copper-alloy tubing (Type K, WK, L, WL)	ASTM B 75; ASTM B 88; ASTM B 251; ASTM B 447
Cross-linked polyethylene (PEX) plastic tubing	ASTM F 876; ASTM F 877; CSA B137.5
Cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) pipe	ASTM F 1281; ASTM F 2262; CAN/CSA B137.10M
Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE)	ASTM F 1986
Ductile iron water pipe	AWWA C151; AWWA C115
Galvanized steel pipe	ASTM A 53
Polyethylene (PE) plastic pipe	ASTM D 2239; ASTM D 3035; CSA B137.1
Polyethylene (PE) plastic tubing	ASTM D 2737; CSA B137.1
Polyethylene/aluminum/polethylene (PE-AL-PE) pipe	ASTM F 1282; CAN/CSA B137.9
Polypropylene (PP) plastic pipe or tubing	ASTM F 2389; CSA B137.11
Polyvinyl chloride (PVC) plastic pipe	ASTM D 1785; ASTM D 2241; ASTM D 2672; CSA B137.3
Stainless steel pipe (Type 304/304L)	ASTM A 312; ASTM A 778
Stainless steel pipe (Type 316/316L)	ASTM A 312; ASTM A 778

WATER DISTRIBUTION PIPE

MATERIAL	STANDARD
Brass pipe	ASTM B 43
Chlorinated polyvinyl chloride (CPVC) plastic pipe and tubing	ASTM D 2846; ASTM F 441; ASTM F 442; CSA B137.6
Copper or copper-alloy pipe	ASTM B 42; ASTM B 302
Copper or copper-alloy tubing (Type K, WK, L, WL, M or WM)[a]	ASTM B 75; ASTM B 88; ASTM B 251; ASTM B 447
Cross-linked polyethylene (PEX) plastic tubing	ASTM F 876; ASTM F 877; CSA B137.5
Cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) pipe	ASTM F 1281; ASTM F 2262; CAN/CSA B137.10M
Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE)	ASTM F 1986
Ductile iron pipe	AWWA C151/A21.51; AWWA C115/A21.15
Galvanized steel pipe	ASTM A 53
Polyethylene/aluminum/polyethylene (PE-AL-PE) composite pipe	ASTM F 1282
Polypropylene (PP) plastic pipe or tubing	ASTM F 2389; CSA B137.11
Stainless steel pipe (Type 304/304L)	ASTM A 312; ASTM A 778
Stainless steel pipe (Type 316/316L)	ASTM A 312; ASTM A 778

a. Below grade Type K, WK, L, WL



NOTE: TOILET FLUSH HANDLE TO BE LOCATED ON OPEN SIDE: SEE PLAN.

6A ADA TOILET REQUIREMENTS

FITTINGS FOR CHANGE IN DIRECTION

TYPE OF FITTING PATTERN	CHANGE IN DIRECTION		
	Horizontal to vertical	Vertical to horizontal	Horizontal to horizontal
Sixteenth bend	X	X	X
Eighth bend	X	X	X
Sixth bend	X	X	X
Quarter bend	X	X[d,f]	X[e]
Short sweep	X	X[b]	X[a]
Long sweep	X	X	X
Sanitary tee	X[c]	—	—
Wye	X	X	X
Combination wye and eighth bend	X	X	X

For SI: 1 inch = 25.4 mm.

a. The fittings shall only be permitted for a 2-inch or smaller sink or lavatory fixture drain.

b. Two inches or larger.

c. For a limitation on double sanitary tees, see Section 706.3.

d. May be used only within 12 inches below water closet flange measured to centerline of the quarter bend.

e. This fitting shall only be permitted to be used as the first fitting directly behind the fixture for drains 2 inches and smaller except clothes washers.

f. The heel inlet connection of a quarter bend may be used as a wet or dry vent if the heel inlet connection of the quarter bend is located in the vertical position. The heel or side inlet connection may be used as a wet vent if the quarter bend is located directly below a water closet or other fixture with one integral trap.

TABLE 906.1

MAXIMUM DISTANCE OF FIXTURE TRAP FROM VENT

SIZE OF TRAP (Inches)	SLOPE (Inch per foot)	DISTANCE FROM TRAP (Feet)
$1\frac{1}{4}$	$\frac{1}{4}$	5
$1\frac{1}{2}$	$\frac{1}{4}$	6
2	$\frac{1}{4}$	8
3	$\frac{1}{8}$	12
4	$\frac{1}{8}$	16

SLOPE OF HORIZONTAL DRAINAGE PIPE

SIZE (Inches)	MINIMUM SLOPE (Inch per foot)
2½ or less	¼
3 to 6	⅛
8 or larger	1/16

For SI: 1 inch = 25.4 mm, 1 inch per foot = 83.3 mm/m.

DRAINAGE FIXTURE UNITS FOR FIXTURE DRAINS OR TRAPS

FIXTURE DRAIN OR TRAP SIZE (Inches)	DRAINAGE FIXTURE UNIT VALUE
1¼	1
1½	2
2	3
2½	4
3	5
4	6

DRAINAGE FIXTURE UNITS FOR FIXTURES AND GROUPS

FIXTURE TYPE	DRAINAGE FIXTURE UNIT VALUE AS LOAD FACTORS	MINIMUM SIZE OF TRAP (Inches)
Automatic clothes washers, commercial[a,g]	3	2
Automatic clothes washers, residential[g]	2	2
Bathroom group as defined in Section 202 (1.6 gpf water closet)[f,j]	5	—
Bathroom group as defined in Section 202 (water closet flushing greater than 1.6 gpf)[f]	6	—
Bathtub[b] (with or without overhead shower or whirlpool attachments)	2	1 1/2
Bidet	1	1 1/4
Combination sink and tray	2	1 1/2
Dental lavatory	1	1 1/4
Dental unit or cuspidor	1	1 1/4
Dishwashing machine,[c] domestic	2	1 1/2
Drinking fountain	1/2	1 1/4
Emergency floor drain	0	2
Floor drains[h]	2[h]	2
Floor sinks	Note h	2
Kitchen sink, domestic	2	1 1/2
Kitchen sink, domestic with food waste grinder and/or dishwasher[i]	2	1 1/2
Laundry tray (1 or 2 compartments)	2	1 1/2
Lavatory	1	1 1/4
Shower (based on the total flow rate through showerheads and body sprays) Flow rate: 5.7 gpm or less Greater than 5.7 gpm to 12.3 gpm Greater than 12.3 gpm to 25.8 gpm Greater than 25.8 gpm to 55.6 gpm	 2 3 5 6	 1 1/2 2 3 4
Service sink	2	1 1/2
Sink	2	1 1/2
Urinal	4	Note d
Urinal, 1 gallon per flush or less	2[e]	Note d
Urinal, nonwater supplied	1/2	Note d
Wash sink (circular or multiple) each set of faucets	2	1 1/2
Water closet, flushometer tank, public or private	4[e]	Note d
Water closet, private (1.6 gpf)	3[e]	Note d
Water closet, private (flushing greater than 1.6 gpf)	4[e]	Note d
Water closet, public (1.6 gpf)	4[e]	Note d
Water closet, public (flushing greater than 1.6 gpf)	6[e]	Note d

For SI: 1 inch = 25.4 mm, 1 gallon = 3.785 L, gpf = gallon per flushing cycle, gpm = gallon per minute.

a. For traps larger than 3 inches, use Table 709.2.

b. A showerhead over a bathtub or whirlpool bathtub attachment does not increase the drainage fixture unit value.

c. See Sections 709.2 through 709.4.1 for methods of computing unit value of fixtures not listed in this table or for rating of devices with intermittent flows.

d. Trap size shall be consistent with the fixture outlet size.

e. For the purpose of computing loads on building drains and sewers, water closets and urinals shall not be rated at a lower drainage fixture unit unless the lower values are confirmed by testing.

f. For fixtures added to a dwelling unit bathroom group, add the dfu value of those additional fixtures to the bathroom group fixture count.

g. See Section 406.3 for sizing requirements for fixture drain, branch drain, and drainage stack for an automatic clothes washer standpipe.

h. See Sections 709.4 and 709.4.1.

i. Fixture arm and trap shall be 1 1/2-inch minimum; vertical drain shall be 2-inch minimum.

j. For one- and two-family dwelling units, add 2 DFU for each additional full bath.

TABLE 308.5
HANGER SPACING

PIPING MATERIAL	MAXIMUM HORIZONTAL SPACING (feet)	MAXIMUM VERTICAL SPACING (feet)
ABS pipe	4	10[b]
Aluminum tubing	10	15
Brass pipe	10	10
Cast-iron pipe	5[a]	15
Copper or copper-alloy pipe	12	10
Copper or copper-alloy tubing, $1\frac{1}{4}$-inch diameter and smaller	6	10
Copper or copper-alloy tubing, $1\frac{1}{2}$-inch diameter and larger	10	10
Cross-linked polyethylene (PEX) pipe	2.67 (32 inches)	10[b]
Cross-linked polyethylene/ aluminum/cross-linked polyethylene (PEX-AL-PEX) pipe	2.67 (32 inches)	4
CPVC pipe or tubing, 1 inch and smaller	3	10[b]
CPVC pipe or tubing, $1\frac{1}{4}$ inches and larger	4	10[b]
Steel pipe	12	15
Lead pipe	Continuous	4
Polyethylene/aluminum/ polyethylene (PE-AL-PE) pipe	2.67 (32 inches)	4
Polypropylene (PP) pipe or tubing 1 inch and smaller	2.67 (32 inches)	10[b]
Polypropylene (PP) pipe or tubing, $1\frac{1}{4}$ inches and larger	4	10[b]
PVC pipe	4	10[b]
Stainless steel drainage systems	10	10[b]

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. The maximum horizontal spacing of cast-iron pipe hangers shall be increased to 10 feet where 10-foot lengths of pipe are installed.

b. Midstory guide for sizes 2 inches and smaller.

TABLE 710.1(1)
BUILDING DRAINS AND SEWERS

DIAMETER OF PIPE (inches)	MAXIMUM NUMBER OF DRAINAGE FIXTURE UNITS CONNECTED TO ANY PORTION OF THE BUILDING DRAIN OR THE BUILDING SEWER, INCLUDING BRANCHES OF THE BUILDING DRAIN[a, b, d]			
	Slope per foot			
	1/16 inch	1/8 inch	1/4 inch	1/2 inch
1 1/4	—	—	1	1
1 1/2	—	—	3	3
2	—	—	21	26
2 1/2	—	—	24	31
3[c]	—	36	42	50
4	—	180	216	250
5	—	390	480	575
6	—	700	840	1,000
8	1,400	1,600	1,920	2,300
10	2,500	2,900	3,500	4,200
12	3,900	4,600	5,600	6,700
15	7,000	8,300	10,000	12,000

For SI: 1 inch = 25.4 mm, 1 inch per foot = 83.3 mm/m.
a. The minimum size of any building drain serving a water closet shall be 3 inches.
b. No building sewer shall be less than 4 inches in size.
c. No more than three water closets.
d. Minimum 2-inch diameter.

TABLE 710.1(2)
HORIZONTAL FIXTURE BRANCHES AND STACKS[a, f]

DIAMETER OF PIPE (inches)	MAXIMUM NUMBER OF DRAINAGE FIXTURE UNITS (dfu)			
		Stacks[b]		
	Total for horizontal branch[a]	Total discharge into one branch interval	Total for stack of three branch intervals or less	Total for stack greater than three branch intervals
1 1/2	3	2	4	8
2	6	6	10	24
2 1/2	12	9	20	42
3[g]	20[d]	20[d]	48	72
4	160	90	240	500
5	360	200	540	1,100
6	620	350	960	1,900
8	1,400	600	2,200	3,600
10	2,500	1,000	3,800	5,600
12	3,900	1,500	6,000	8,400
15	7,000	Note c	Note c	Note c

For SI: 1 inch = 25.4 mm.
a. Does not include branches of the building drain. Refer to Table 710.1(1).
b. Stacks shall be sized based on the total accumulated connected load at each story or branch interval. As the total accumulated connected load decreases, stacks are permitted to be reduced in size. Stack diameters shall not be reduced to less than one-half of the diameter of the largest stack size required.
c. Sizing load based on design criteria.
d. No more than three water closets.
e. 50 percent less for circuit-vented fixture branches.
f. Minimum of 2-inch diameter underground.
g. The minimum size of any branches serving a water closet shall be 3 inches.

TABLE 403.1
MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a]
(See Sections 403.2 and 403.3)

NO.	CLASSIFICATION	OCCUPANCY	DESCRIPTION	WATER CLOSETS (URINALS SEE SECTION 419.2)[c]		LAVATORIES[f]		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410.1)[g]	OTHER[a]
				MALE	FEMALE	MALE	FEMALE			
1	Assembly (see Sections 403.2, 403.5 and 403.6)	A-1[d]	Theaters usually with fixed seats and other buildings for the performing arts and motion pictures	1 per 125	1 per 65	1 per 200		—	1 per 500	—
			Theaters in K-12 schools[i]	1 per 125	1 per 100	1 per 200		—	1 per 500	1 service sink
		A-2[d]	Nightclubs, bars, taverns, dance halls and buildings for similar purposes	1 per 40	1 per 40	1 per 75		—	1 per 500	—
			Restaurants, banquet halls and food courts	1 per 75	1 per 75	1 per 200		—	1 per 500	1 service sink[h]
			Cafeterias in K-12 schools[i]	1 per 125	1 per 100	1 per 200		—	1 per 500	1 service sink
		A-3[d]	Auditoriums without permanent seating, art galleries, exhibition halls, museums, lecture halls, libraries, arcades and gymnasiums	1 per 125	1 per 65	1 per 200		—	1 per 500	—
			Gymnasiums in K-12 schools[i]	1 per 125	1 per 100	1 per 200		—	1 per 500	1 service sink
			Passenger terminals and transportation facilities	1 per 500	1 per 500	1 per 750		—	1 per 1,000	1 service sink
			Places of worship and other religious services. Churches without assembly halls[e]	1 per 150	1 per 75	1 per 200		—	1 per 1,000	—

(continued)

NO.	CLASSIFICATION	OCCUPANCY	DESCRIPTION	WATER CLOSETS (URINALS SEE SECTION 419.2)[d]		LAVATORIES[d]		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410.1)[d]	OTHER[g]
				MALE	FEMALE	MALE	FEMALE			
1 cont'd	Assembly (see Sections 403.2, 403.5 and 403.6) cont'd	A-4	Coliseums, arenas, skating rinks, pools and tennis courts for indoor sporting events and activities	1 per 75 for the first 1,500 and 1 per 120 for the remainder	1 per 40 for the first 1,520 and 1 per 60 for the remainder	1 per 200	1 per 150	—	1 per 1,000	—
		A-5	Stadiums, amusement parks, bleachers and grandstands for outdoor sporting events and activities[k]	1 per 75 for the first 1,500 and 1 per 120 for the remainder	1 per 40 for the first 1,520 and 1 per 60 for the remainder	1 per 200	1 per 150	—	1 per 1,000	—
			K-12 stadiums, bleachers and grandstands for outdoor sporting events and activities[l,k]	1 per 125	1 per 100	1 per 250	1 per 200		1 per 1,000	—
2	Business (see Sections 403.2, 403.4 and 403.6)	B	Buildings for the transaction of business, professional services, other services involving merchandise, office buildings, banks, light industrial and similar uses	1 per 25 for first 50 occupants and 1 per 50 for remaining occupants exceeding 50		1 per 40 for first 80 occupants and 1 per 80 for remaining occupants exceeding 80		—	25 100 1 101 250 2 251 500 3 add 1 per 500 exceeding 500	—
3	Educational[i]	E[k]	K-8 9 through 12 Teacher/Staff	1 per 25 1 per 30 1 per 30	1 per 25 1 per 25 1 per 25	1 per 60 1 per 100 1 per 100		—	1 per 100	—
4	Factory and Industrial	F-1 and F-2	Structures in which occupants are engaged in work fabricating, assembly or processing of products or materials (see Section 403.3.1 for adjustments to occupant content)	(See OSHA 29 CFR paragraph 1910.14.1)				(see Section 411)	1 per 400	—
5	Institutional	I-1	Residential care	1 per 10		1 per 10		1 per 8	—	—
		I-2	Hospitals and other health care facilities[c]	Fixture requirements are regulated and enforced by state licensing and certification jurisdictions only.						
			Employees	1 per 25		1 per 35		—	1 per 100	—
			Visitors	1 per 75		1 per 100		—	1 per 500	—
		I-3	Prisons[b]	Fixture requirements are regulated and enforced by state licensing and certification jurisdictions only.						
			Reformatories, detention centers, and correctional centers[b]	Fixture requirements are regulated and enforced by state licensing and certification jurisdictions only.						
			Employees	1 per 25		1 per 35		—	1 per 100	—
			Visitors	1 per 75		1 per 100		—	1 per 500	—
		I-4	Adult day care	Fixture requirements are regulated and enforced by state licensing and certification jurisdictions only.						
			Child care[k]	1 per 15		1 per 25		—	—	—
			Employees	1 per 25		1 per 35		—	1 per 100	—
			Visitors	1 per 75		1 per 100		—	1 per 500	—

NO.	CLASSIFICATION	OCCUPANCY	DESCRIPTION	WATER CLOSETS (URINALS SEE SECTION 419.2)[j]		LAVATORIES[d]		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410.1)[j]	OTHER[g]
				MALE	FEMALE	MALE	FEMALE			
6	Mercantile (see Sections 403.2, 403.5, 403.6)	M	Retail stores, service stations, shops, salesrooms, markets and shopping centers	1 per 500		1 per 750		—	100 1,000 1 greater than 1,000 require 1 more for each additional 1,000	—
7	Residential	R-1	Hotels, motels, boarding houses (transient)	1 per guestroom		1 per guestroom		1 per guestroom	—	—
		R-2	Dormitories, fraternities, sororities and boarding houses (nontransient)	1 per 10		1 per 10		1 per 8	1 per 100	—
			Apartment house	1 per dwelling unit		1 per dwelling unit		1 per dwelling unit	—	1 kitchen sink per dwelling unit; 1 automatic clothes washer connection per 20 dwelling units
		R-3[k]	One- and two-family dwellings	1 per dwelling unit		1 per dwelling unit		1 per dwelling unit	—	1 kitchen sink per dwelling unit[f]
		R-4	Residential care/unlicensed assisted living facilities	1 per 10		1 per 10		1 per 8	—	—
8	Storage (see Sections 403.2 and 403.4)	S-1 S-2	Structures for the storage of goods, warehouses, storehouse and freight depots, low and moderate hazard[m,n]	1 per 100		1 per 100		See Section 411	—	—

a. The fixtures shown are based on one fixture being the minimum required for the number of persons indicated or any fraction of the number of persons indicate The number of occupants shall be determined by the *International Building Code*.

b. Toilet facilities for employees shall be separate from facilities for inmates, students or patients.

c. A single-occupant toilet room with one water closet and one lavatory serving not more than two adjacent patient rooms shall be permitted where such room is pr vided with direct access from each patient room and with provisions for privacy.

d. The occupant load for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of facilities required.

e. The number of fixtures provided shall be based on either the capacity of the church sanctuary or the church educational building, whichever is larger and within 30 feet (91.44) m.

f. For attached one- and two-family dwellings, one automatic clothes washer connection shall be required per 20 dwelling units.

g. A mop receptacle with a water supply, or a hose bib and floor drain, may be used in lieu of a service sink.

h. A can wash may be used in lieu of a service sink.

i. See Section 403.9 for additional information on plumbing fixtures for schools.

j. When the rearrangement of an area or space increases the occupant content, the plumbing facilities shall be increased in accordance with this code.

k. For baseball stadiums, the number of fixtures shall be reduced by 50 percent.

l. Service sink may be omitted when located within a single-family dwelling.

m. Self-service mini-storage facilities without an office area are exempt.

n. Unheated storage buildings which are used periodically are not required to have toilet rooms.

E. ELECTRIC:

☐ Electric Panel board complete:
- Proper size/type circuit breakers
- Minimum (1) 20 amp bathroom circuit
- No damaged conductors
- Lugs not over-filled
- Same size conductors on same lug
- Oxide inhibitor (Noalox) installed at aluminum conductors terminations in lugs/breakers
- Dead front installed
- No unused knockouts
- 1/4" air space behind panel
- Plywood support panel painted

☐ Install grounding electrode conductor
☐ Minimum #4 copper water/gas bond, (200 amp service)
☐ Ground metallic water service if 10' or more within interior only of building
☐ SES has minimum ¼" air space back of enclosure
☐ SE & NM cable supported 4 1/2' OC & within 8" of NM boxes
☐ SE & NM cable protected from damage
☐ No SE & NM cable within 6' of attic scuttle or protected
☐ Minimum (2) 20 amp small appliance circuits @ kitchen & dining, pantry & breakfast areas
☐ Kitchen counters have receptacles spaced maximum 48" OC and within 24" of ends of counter tops
☐ Floor boxes listed for purpose intended
☐ Bedroom circuits wired for Arc-Fault protection
☐ All electric boxes secured, no over-fill, no pancake boxes less than 6 cubic inches
☐ Minimum 6" of conductors within boxes
☐ Minimum 1/4" of NM sheathing within boxes
☐ Boxes for range/ovens have proper knockouts & size for conductors
☐ Proper size circuit conductors for A/C's, ranges, cook tops, water heaters & dryer
☐ Minimum (1) 20 amp circuit for laundry outlets
☐ Minimum (1) 20 amp circuit for bathroom receptacles GFCI
☐ General receptacle spacing @ 12' OC & within 6' of all door openings and at least (1) at walls > 24" in width,
- no wall space more than 6ft from receptacle

☐ GFCI receptacle locations
☐ Smoke detector locations: all interconnected
1. All bedrooms
2. All bedroom hallways
3. Minimum (1) in basement / Minimum (1) on each floor

☐ Smoke detectors installed per manufacturer's instructions

☐ Attic furnaces:
1. Light switch @ scuttle opening & light at equipment
2. Disconnect for equipment hardwired (No Cord & Plug)
3. General purpose recept at same level & w/i 25' of HVAC

☐ Metal boxes properly grounded
☐ Hydro massage tub
1. Tub motor bonded with #8 solid to water piping & elec equip.
2. Circuit GFCI protected
3. Motor & receptacle / disconnect accessible

☐ Permanently connected appliances > 300 volt - amperes or 1/8 HP have circuit breaker locks or disconnecting means

Table 250.66 Grounding Electrode Conductor for Alternating-Current Systems

Size of Largest Ungrounded Service-Entrance Conductor or Equivalent Area for Parallel Conductors[a] (AWG/kcmil)		Size of Grounding Electrode Conductor (AWG/kcmil)	
Copper	Aluminum or Copper-Clad Aluminum	Copper	Aluminum or Copper-Clad Aluminum[b]
2 or smaller	1/0 or smaller	8	6
1 or 1/0	2/0 or 3/0	6	4
2/0 or 3/0	4/0 or 250	4	2
Over 3/0 through 350	Over 250 through 500	2	1/0
Over 350 through 600	Over 500 through 900	1/0	3/0
Over 600 through 1100	Over 900 through 1750	2/0	4/0
Over 1100	Over 1750	3/0	250

Notes:

1. Where multiple sets of service-entrance conductors are used as permitted in 230.40, Exception No. 2, the equivalent size of the largest service-entrance conductor shall be determined by the largest sum of the areas of the corresponding conductors of each set.

2. Where there are no service-entrance conductors, the grounding electrode conductor size shall be determined by the equivalent size of the largest service-entrance conductor required for the load to be served.

[a]This table also applies to the derived conductors of separately derived ac systems.

[b]See installation restrictions in 250.64(A).

Table 20 • Box Fill Worksheet			
Item	**Size**	**#**	**Total**
#14 conductors exiting box	2.00		
#12 conductors exiting box	2.25		
#10 conductors exiting box	2.50		
#8 conductors exiting box	3.00		
#6 conductors exiting box	5.00		
Largest grounding conductor—count only one		1	
Devices—2x times connected conductor size			
Internal clamps—one based on largest wire present		1	
Fixture fittings—one for each type based on largest wire			
TOTAL			

Based on NEC 370-16(b).

Table 10 • Sizing Conductors				
Fuse or Breaker	**Branch Circuits or Feeders Wire Size[a]**		**Service Conductors Wire Size[b]**	
	Copper	**Aluminum**	**Copper**	**Aluminum**
15	14	12		
20	12	10		
25	10	10		
30	10	8		
35	8	6		
40	8	6		
45	6	4		
50	6	4		
60	6	3		
70	4	2		
80	3	1		
90	2	1/0		
100	2	1/0	4	2
110	1	1/0	3	1
125	1/0	1/0	2	1/0
150	1/0	2/0	1	2/0
175	2/0	3/0	1/0	3/0
200	3/0	4/0	2/0	4/0
225	4/0	250kcmil	3/0	250kcmil
250	4/0	300kcmil	4/0	300kcmil
300	300kcmil	400kcmil	250kcmil	350kcmil
350	400kcmil	600kcmil	350kcmil	500kcmil
400	500kcmil	700kcmil	400kcmil	600kcmil

a. Branch circuit and feeder wire sizes are based on table 310-16 of the NEC. The 60°C column is used for sizes #1 or smaller, and the 75°C column is used for larger sizes.
b. Service conductor sizes are based on the wire types in NEC table 310-15(b)(6).

ENERGY REQUIREMENTS

- ☐ R-30 Ceiling, R-19 Floors R-13 Walls
- ☐ R-5 Pull down stairs
- ☐ Horizontal attic opening R-10
- ☐ Programmable thermostat
- ☐ Glazing U-factor .35
  SHGC .35
- ☐ Energy Card
- ☐ Duct Blaster test data .30 CFM50/Sq foot of Surface area or
  5 air changes per hour (ACH50)
- ☐ Blower Door test or Visual insp. certificate

FINAL INSPECTION

GARAGE:

- ☐ Floor slopes to a drain or vehicle door
- ☐ Garage receptacles GFCI or single devices for dedicated use. Dedicated labeled non GFI
- ☐ All appliances installed in garage have vehicle protection (steel bollard or out of path)
- ☐ Appliances with ignition source elevated 18"
- ☐ Gas lines under minimum (10 psi pressure test for 15) minutes with all SOV's in open position with flex connector installed & capped. SOV within 3' of appliance (except range, 6')
- ☐ Upper & lower combustion air vents installed as required
- ☐ Expansion tanks
- ☐ Gas appliance single wall vent connectors sloped minimum 1/4" per ft and all joints fastened with (3) sheet metal screws each
- ☐ Metal ceiling fire-stop installed at "B" vent penetration at ceiling per manufacturer's instructions
- ☐ W/H T & P drain completed, sloped 1/8" per ft, terminates 6" minimum or 24" max
- ☐ Occupancy separation door between house & garage:
  1. 1 3/8" minimum solid core or rated 20 minutes
  2. Smoke seal gaskets at jambs & header

ATTIC AREA:

- ☐ Scuttle opening 20x30 finished
- ☐ Primary & secondary condensate drains installed, trapped & vented
- ☐ No insulation in attic A/H drain pans
- ☐ Furnace & air handler connected to supply circuit disconnect switch and within sight
- ☐ All electric in attic trimmed out
- ☐ Upper & lower combustion air ducts installed and clear
- ☐ Ridge vents, dormer vents & O-Hagen-tile vent openings installed per attic ventilation calcs
- ☐ Attic insulation installed per plans

LAUNDRY:

- ☐ Exhaust fan installed or 1.5 sf openable window
- ☐ 20 amp receptacle in laundry (within 6')
- ☐ Dryer vent extends beyond finished surface
- ☐ Floor drains, if installed, have trap primer to maintain wet seal
- ☐ Ceiling light & switch installed

HALLWAYS:

- ☐ 36" minimum clear width
- ☐ Minimum (1) electric receptacle if > 10 ft in length
- ☐ Smoke alarms outside each separate sleeping area
- ☐ Exit Door – side hinged, min. 3' wide X 6'8 height

STAIRS:

- ☐ 36" minimum width, 36" minimum landings
- ☐ Landing depth same width as stairs
- ☐ Minimum 10" depth, maximum 7 3/4" rise, risers & treads +/- 3/8"
- ☐ 6'8" minimum head clearance
- ☐ Handrails required at four or more risers
- ☐ Handrails 34" to 38" above nose of tread to top of handrail
- ☐ Handrails have 1 1/2" clearance to wall
- ☐ Handrails grip size
- ☐ Handrails extend to top & bottom risers with returns to wall or newel post
- ☐ Safety glazing @ windows @ landings < 60" A.F.F.
- ☐ Minimum 36" high guardrail with max 4" space between members
- ☐ Wall switch for lighting each floor level

BEDROOMS & DENS (w/closet):

- ☐ Minimum 5.0 sf opening egress window at grade; 5.7sf 2nd flr.
- ☐ Minimum, egress opening 24" height 20" width, 4 sq ft opening
- ☐ Window sill height max 44"
- ☐ Fall protection windows
- ☐ Basement window well width minimum 36", 9 sf minimum total area
- ☐ Window well ladder required if height > 44"
- ☐ Grate covers have 5.7 sf openable area w/ no locks
- ☐ Natural light - 8% floor area, minimum 4 sf
- ☐ Natural ventilation 4% floor area, minimum 4 sf
- ☐ Smoke alarms each bedroom, all alarms interconnected
- ☐ Carbon monoxide detectors
- ☐ Light fixtures installed in clothes closets minimum 12" or depth of shelf horizontally from shelf, 6" minimum if fluorescent

BATHROOMS:

- ☐ Exhaust fans installed, minimum 50 cfm & vented to exterior at all water closet rooms & bathrooms or natural ventilation 1.5 sf minimum
- ☐ Lavatory sinks/faucets/drains installed & tested. Minimum 2 GPM aerator
- ☐ Wall cleanouts installed if necessary
- ☐ Trap arms offset maximum 90 degrees
- ☐ Water closet 1.6 GPF
- ☐ 30" Clear width @ W/C
- ☐ 15" minimum from wall to center of W/C
- ☐ No offset flange for W/C
- ☐ W/C base caulked at floor
- ☐ Shower compartment minimum 30"
- ☐ Minimum 22" wide door @ shower
- ☐ Safety glazing at all windows < 60" above floor
- ☐ Moisture resistant finish in shower to 72" above floor
- ☐ Shower/tub enclosure walls sealed at all openings for piping, valves, etc.
- ☐ Minimum 3 GPM shower heads

KITCHEN / DINING:

- ☐ Natural light 8% floor area
- ☐ Natural ventilation 4% floor area
- ☐ 20 amp receptacles at kitchen, dining, pantry, breakfast area
- ☐ Countertop receptacles spaced maximum 48" OC & within 24" of ends of counters
- ☐ GFCI protection at all kitchen counter receptacles
- ☐ Outlet boxes in cabinets not recessed into combustibles
- ☐ Kitchen sink, drain, faucet installed, minimum 2.5 GPM aerator
- ☐ Wall clean out installed for sink and foot vent, if applicable

- ☐ Sink trap arm offset maximum 90 degrees
- ☐ Dishwasher drain connected
- ☐ Dishwasher receptacle installed and within 6', cord connected
- ☐ Permanent cooking appliances installed w/wiring & venting complete
- ☐ Nameplate rating of cooking appliances match conductor sizing and over current protection
- ☐ Electric wiring within cabinets protected from damage w/metallic flex conduit & metal boxes used
- ☐ All gas lines for cooking appliances have S.O.V. installed w/metallic flex line capped for pressure test

GYPSUM WALLBOARD:

- ☐ ½" gypsum under stairs where accessible
- ☐ Gypsum shear fastening per shear schedule
- ☐ Horizontal blocking & nailing at horizontal joints installed per shear schedule
- ☐ Minimum 1 3/8" nails @ 7"oc @ ½' gypsum ceilings, 8"oc walls
- ☐ Exterior soffit board used at patio ceilings and entry ceilings unless properly protected from weather
- ☐ Garage ceiling w/ livable above 5/8" Type X gypsum

EXTERIOR:

- ☐ Address numbers plainly visible and legible from street
- ☐ Exterior two-way sanitary waste cleanout plugs installed & set to grade
- ☐ All exterior wall finishes complete & painted
- ☐ All exterior wall cleanouts installed where necessary
- ☐ All exterior doors & windows installed
- ☐ Exterior door landings within 1 ½" of threshold if door swings out
- ☐ Exterior door landings within 8" of threshold if door swings in
- ☐ Roofing complete
- ☐ Fireplace spark arrestor installed, minimum 2' above any roof within 10' horizontally
- ☐ "B" vents minimum 1' above roof & not within 4' of window & minimum 8' from vertical wall
- ☐ Gable end roof vents, dormer vents, installed per attic ventilation calcs
- ☐ Roof mounted heat pumps have disconnects within sight of equipment & proper fuse sizes
- ☐ Ground mounted condensing units have disconnects within sight of equipment with proper fuses and proper working clearance & concrete pad
- ☐ All roof flashing installed
- ☐ Exterior GFCI receptacles installed & labeled covers
- ☐ Exterior light fixtures installed at exit doors
- ☐ Exterior flood lights have W/P boxes
- ☐ Exterior j-boxes have W/P covers
- ☐ Water heater T & P drain terminates 6" A.F.G. to exterior
- ☐ A/C condensate drain(s) installed to exterior w/ 90° elbows
- ☐ All hose bibs installed w/vacuum breakers
- ☐ Grade away from foundation 6" minimum within 10'
- ☐ Contrasting address numbers installed with minimum 3" height
- ☐ Garage driveway installed
- ☐ Crawl space access 18" x 24"

FINAL SPRINKLERS PER PLAN IF REQUIRED OR OPTION:

- ☐ Installed per Engineered design
- ☐ Separate electric service for well site
- ☐ Well water low level alarm tested at dwelling (must be audible inside house)
- ☐ Well site pump PSI per plan
- ☐ Low level alarm setting for water well set per plan
- ☐ Test switch accessible
- ☐ Exterior water flow alarm tested at dwelling
- ☐ Check sprinkler heads for obstruction i.e. fans lights, shelves, walls, etc.
- ☐ Spare sprinkler heads provided (1 each type, 2 heads min)
- ☐ Inspectors Test – 3/8 test orifice in place
- ☐ Perform flow test

1. Check minimum required PSI per plan
2. Inspectors test wide open minimum 2 minutes
3. Requires PSI = or > plan PSI entire 2 minutes
4. No leaks at controls/relief valves

- ☐ Approval tag left at control panel

Common Handicapped Dimensions

1. Height of water-Closet grab bars: **33" to 36"**
2. Lavatory **minimum** and **maximum** heights**: 34" to 36"** & insulate hot water pipe. (Page 170) **knee clearance 29-inches to lavatory with 27-inches in height clear 8-inches deep at shallowest point, toe space is to be allowed for**. (Detail page 177)
3. Toilet Paper Dispenser height **19-inches to 36"** (page 174)
4. Hand dryer **48-inches** to the top of the operating mechanism.
5. Mounting height of mirror **if provided**: Full length in toilet room **9-inches** above the floor or if above the handicapped lavatory maximum mounting height is **40-inches** to bottom edge.
6. Shelves **if provided** above a handicapped lavatory shall be mounted **40-inches** above finished floor (page 179)
7. Length of side grab bars: **42"** (page 167)
8. Length of back grab bar: **36"** (page 167)
9. Diameter of grab bar: **1 ¼ to 1 ½ inches** (page 168)
10. Grab bar pull out strength: **250 pounds** (page 168)
11. Toilet flange rough in from wall: **18-inches to center** (page 169)
12. Toilet Height is **16 ½ to 19- ½ -** inches above the floor. (Page 169)
13. Toilet Flush on wide side of toilet mounted at a maximum of **44-inches**. The actuation may be automatic or a flush handle if a handle **5-pounds of force** shall activate flush. (Page 171)
14. Handicapped toilet room **single toilet facilities**. Within each toilet room the shall be:
    (1) A minimum **60 by 60 Inches** or
    (2) A minimum **60 by 60 Inches** turning circle
    (3) Or a T shaped space see detail (Page 164.)
15. Toe space a minimum **6-inches deep by 8-¾** -inches high may be used to supplement 60 by 60-inch floor area in rooms of limited area. (Page 162)
16. Diaper changing tables **if provided** in the women's toilet facilities they shall also be in the men's toilet facilities.
17. Maximum distance to a toilet room in a mall, shopping centers and school **shall not exceed 200-feet**. (Page 161)
18. **Unisex toilet** allowed as follows when the building is **2,500** square feet or less a lockable door is required:
    (1) Churches or places of worship;
    (2) Barber shops, Beauty Shops, offices & coin operated laundries;
    (3) Retail stores; (4) Ware-houses (page 186)

19. **Unisex toilet** allowed as follows when the building is 1,200 square feet or less: **School Classrooms** for kindergarten thought 2nd grade or is **a modular classroom** used for any grade level. (Page 186).
20. Dimensions of **type-I stall** with: floor mounted water closet is **59-inches deep clear**, door opens out, **60-inches wide inside stall**, door way is **32-inches clear**, approach is **42-inches** if door swing is not in approach direction, if door swing is towards approach direction the minimum is **48-inches Toilet mounting 18-inches** on center from wall (detail page 172)
21. Dimensions of **type-II stall** with floor mounted water closet**: total length is 95-inches** because the door swings into the stall as a side entry. The stall is **60-inches** wide. Water closet is located **18-inches** on center from the wall. (Detail page 173)
22. Dimension of additional handicapped stall:
    (1) Floor mounted water closet stall depth is 69-inches
    (2) Minimum width is 36-inches
    (3) Door swing is out;
    (4) Approach opposite swing is 42-inches
    (5) Approach in direction of swing is 48-inches
23. Maximum mounting height of handicapped urinal: **17-Inches,** flush control maximum **at 44-inches**. (Page 178)
24. Accessible Water Fountain mounting height is **36-inches to the top** of the spout.
25. Handicapped accessible showers or bathtubs are required. **Each public** or common use bathing facility shall have a minimum of one accessible shower stall or accessible bathtub. (Page 195)

Accessible Ramps

26. **Maximum Slope** shall be 1 in 12 or **1-inch in 1-foot rise** (page 69)
27. Ramps shall be designed for a **100-PSF live load.** (Page 69)
28. Ramps to be designed so **no water accumulates** and may be cross sloped up to ¼ -inch per foot. (Page 69)
29. Exterior ramps Minimum clear width **shall be 48-inches.** (Page 69)
30. At the top of the ramp there shall be a **5-foot by 5-foot** minimum clear landing. (Page 70)
31. Ramps shall have intermediate landings of flat surface at least 60-inches in length an as wide as the ramp placed at least **every 30-feet.**
32. Ramps making a **90° turn** its landing shall be a minimum of 5-feet by 5-feet. (Page 70)

33. **Handrails shall be provided** on both sides of ramps with a rise greater than **6-inches** or a total length greater **than 72-inches.** (Page 70)
34. Hand rails Shall comply with the following:
    (1) The minimum and maximum gripping surface shall be between **1 ¼ and 1 ½ -inches.** (Page 70).
    (2) Mounting height of the handrails shall be between **34-inches** and **38-inches.** (Page 70)
    (3) Gripping surface shall be continuous.
35. **Ramp edge protection** is required to keep wheel chair, canes or crutches from slipping of the edge of the ramp. When a vertical distances greater than **½ -inch** occurs. (Page 71)

Parking Lots & handicapped parking spaces

36. 1-25 spaces = 1 handicapped space
37. 26-50 spaces = 2 handicapped spaces
38. 51-75 spaces = 3 handicapped spaces
39. 76-100 spaces = 4 handicapped spaces
40. 101-150 spaces = 5 handicapped spaces
41. 151-200 spaces = 6 handicapped spaces
42. 201-300 spaces =7 handicapped spaces
43. 301-400 spaces =8 handicapped spaces (page 33)
44. Van Accessible Parking Spaces 1- in 8 handicapped spaces shall be van accessible or a minimum of 1-space which ever is greater. See (Page 34).
45. Size of non-van accessible space is **96-inches** with an additional **60-inch** access isle. (Page 34)
46. Size of Van accessible parking space is **96-inches** with an additional **96-inch** access isle. (Page 34)
47. Parking spaces on hard surfaces such as asphalt shall be **painted lines** or other acceptable means. (Page 34)
48. Maximum distance of travel from a handicapped parking space to **accessible entrances** shall be **200-feet.** (Page 35)
49. Signs R7-8, R-78D, R7-8E are the **proper signs,** van accessible sign is not so marked. (Page 38)
50. Condition-1 mounting height; Condition 1 is when pedestrians do not pass under or around signs; e.g. surface mounted on a building. The mounting height is 60-inches to bottom of R7-8 with R7-8D $250.00 penalty sign mounted below. Van accessible if applicable to be above

R7-8. (Page 38)

51. Condition-2 is when pedestrians do pass under or around signs. These mounting heights are: The mounting height is 84-inches to bottom of R7-8 with R7-8D **$250.00 penalty sign** mounted below. Van accessible if applicable to be above R7-8. (Page 38)
52. Alternate sign R7-8E may be used its condition-1 mounting height is 51-inches. Van accessible if applicable to be above R7-8E (page 38)
53. Alternate sign R7-8E may be used its condition-2 mounting height is 75-inches. Van accessible if applicable to be above R7-8E. (Page 38)

DOORS DOORWAYS AND DOOR HARDWARE

54. **Exterior and Interior** doors to have a minimum of **32-inches clear.**
55. Framed glass doors are use a **7-½ -inch** bottom panel shall be provided. (Page 135)
56. Maximum threshold height shall not exceed **¾ -inch** for exterior sliding doors **½ -inch** for all others. (Page 135)
57. Mounting height of door opening hardware is **30- inches to 48-inches.** (Page 136)
58. **Door handles shall be accessible type** such as lever, pull handle or push pull latch. (Page 138).

Alarms and strobes

59. **If alarm-indicating appliances are provided** then audible and visual alarm shall be installed according to Chapter 17. (Page 289)
60. **Wall Mounting heights** shall be between 80-96-inches above the finished floor.
61. **Visual alarms (strobes)** shall be located in all toilet rooms, meeting rooms, corridors, and common rooms see page 289.
62. **Visual Appliances** in corridors to meet table on page 292.
63. **Visual appliance to** be located within 15 feet of the end of a corridor.

This is only some of the more common requirements of the NC State Building Code Volume IC. It is suggested that you obtain a copy for your reference. You may order a copy from the State Fire Marshall's Office. Phone 919-733-3901.

Daycare Building Code Requirements

1. All areas / rooms for children 2 ½ years or less of age shall have exit doors opening directly to the outside or building shall be sprinkled.

2. All areas / rooms for children more than 2 ½ years of age shall have emergency egress windows or exit doors opening directly to the outside. The minimum dimensions for emergency egress windows are as follows:

   Minimum net clear height – 24 inches
   Minimum net clear width – 20 inches
   Minimum net clear opening – 5 square feet
   Maximum height above the floor – Grade 5 and under – 32 inches
   all others – 44 inches

3. All required egress doors, interior children room doors and restroom doors shall be 36 inches wide with lever type handles.

4. All daycares with an occupant load of more than 10 people shall have emergency lights installed outside all exit doors and in all corridors, exit enclosures and exit passageways.

5. Exit signs shall be installed at each required egress door. They shall be electrically lit with a battery backup.

6. All hallways, corridors and exit passageways shall be of 1 hour fire rated construction.

7. All egress doors shall have not more than 1 lock per door. If the occupant load is more than 50 people then all egress doors shall have panic hardware or fire exit hardware installed on the doors.

8. All stairs and steps shall be 36 inches wide. Handrails are required if the stairs / steps have 4 or more risers. If the stairs / steps or landings are higher than 30 inches above the ground / floor guard rails shall be installed.

9. All wall coverings shall be of non-combustible materials. (This includes but is not limited to wood paneling, fabric, foam board, ect...)

10. All HVAC equipment shall be evaluated and a report written by a certified HVAC contractor and submitted to the building inspector to be submitted to the licensing board.

11. All electrical outlets, light fixtures and equipment shall be in a safe condition with all covers properly installed. All receptacles installed outside, on kitchen counter tops and in restrooms shall be GFCI protected. All electrical panel circuits shall be labeled.

12. All restrooms shall meet the requirements of the NC Building Code, Chapter 11 for accessibility. (This includes but is not limited to toilet clearances, grab bars, clear wheel chair area, lever handle faucets, self closing stall doors with coat hooks, toilet paper dispensers locations, paper towel / hand dryers locations, ect…)

13. An alarm system shall be installed in all daycare.

14. All means of egress shall be unobstructed without passing through a closet, storage area, restroom, kitchen or other hazardous space.

15. 60% of all egress doors shall have a handicap ramp installed. The ramp shall have a slope of not more than 1:12, not less than 36 inches net clear width, a landing at the top and bottom of ramp 60 inches in length minimum. Ramps with a rise greater than 6 inches shall have handrails on both sides of ramp. The handrail height shall between 34 – 38 inches above the walking surface. All ramps shall have edge protection.

APPENDIX I

SUGGESTED CHECKLIST FOR USE BY LOCAL INSPECTORS

Date of Manufacture: _____

Wind Zone: _____

Thermal (U/R Value): _____

HUD Label: _____

Specification for Set-Up: State Code _____ Manufacturer's Installation Instructions _____

Over-Height Home: _____

Positive Drainage: _____

Vegetation Under Home Cut to Maximum of 2" Above Grade: _____

All Sod, Stumps, and Organic Materials Removed from Footing Areas: _____

Construction Debris Removed Under Home: _____

Soil Bearing Capacity: _____

Footings: Solid Blocks _____ Pour-in-Place Concrete _____ ABS Pads or other Listed and Labeled Material _____

Footing Size: _____ Footing Depth: _____

Pier Spacing: _____ Pier Height: _____ Single Stacked Piers: _____ Double Stacked Piers: _____

Cap Blocks: _____ Wedges: _____

Marriage Line Pier Location (if required): _____ Perimeter Pier Location (if required): _____

Torque Value of Soil: _____

Anchor Manufacturer: _____ Anchor Model: _____

Anchor Installation: Direct Pull _____ Angled Pull _____ Rock Anchor _____ Concrete Cylinder _____

Stabilizer Plates (if required) _____ Anchor Head Exposed: _____

Approved Tie Strap Material: _____ Strap Angle: _____

Marriage Line Connections: Floor _____ Roof _____ End Walls _____ Ceiling _____

Access to Crawl Space: _____ Tears in Bottom Board Repaired: _____

Skirting Foundation: _____ Skirting Material: _____ Crawl Space Ventilation: _____ Vapor Retarder: _____

Clothes Dryer Vented to Outside: _____

Proper Installation of Crossover Ducts: _____

Utility Connections: Electrical _____ Water Supply _____ DWV System _____ Gas _____

Smoke Detectors: _____

Steps, Landings, Etc.: _____

BUILDING PERMIT	
FOOTING AND SETBACKS	101
SLAB INSPECTION	102
PRE-SUBFLOOR FRAMING	103
NAILING	104
FRAMING AND ROOF HEIGHT	105
INSULATION	106
BUILDING FINAL INSPECTION	110
FOUNDATION WALL	112
PILING	113
GENERAL INSPECTION	114
SIGN FINAL	116
DRIVEWAY PERMIT	
DRIVEWAY PRE-POUR	107
DRIVEWAY FINAL	108
LAND DISTRUBANCE	111
TEMPORARY POLE PERMIT	
TEMPORARY POLE	401
PLUMBING PERMIT	
PLUMBING UNDER SLAB	201
PLUMBING ROUGH-IN	202
SEWER LINE	203
WATER LINE	204
PLUMBING FINAL	205
PLUMBING GAS LINE	206
PLUMBING IRRIGATION	207
SEWER AND WATER LINE	208
MECHANICAL PERMIT	
MECHANICAL ROUGH-IN	301
MECHANICAL GAS LINE ROUGH-IN	302
MECHANICAL GAS LINE FINAL	303
MECHANICAL FINAL	304
MECHANICAL DUCTWORK	306
REFRIGERATION LINE TEST	307
REFRIGERATION FINAL	308
MECHANICAL ABOVE CEILING	309
ELECTRICAL PERMIT	
ELECTRICAL ROUGH-IN	402
ELECTRICAL FINAL	403
ELECTRICAL MOBILE HOME INSP	405
ELECTRICAL UNDER SLAB	406

Appendix M

Wood Decks

(Entire section is a NC amended appendix)

Section AM101
General

AM101.1 General. A deck is an exposed exterior wood floor structure which may be attached to the structure or freestanding. Roofed porches (open or screened-in) may be constructed using these provisions.

AM101.2 Deck design. Computer deck design programs may be accepted by the Code Enforcement Official.

Section AM102
Footers

AM102.1 Footers. Support post shall be supported by a minimum footing per Figure AM102 and Table AM102.1 Minimum footing depth shall be 12" below finished grade per R403.1.4. Tributary area is calculated per Figure AM102.1.

Section AM103
Flashing

AM103.1 Flashing. When attached to a structure, the structure to which attached shall have a treated wood band for the length of the deck, or corrosion-resistant flashing shall be used to prevent moisture from coming in contact with the untreated framing of the structure. Aluminum flashing shall not be used in conjunction with deck construction. The deck band and the structure band shall be constructed in contact with each other except on brick veneer structures and where plywood sheathing is required and properly flashed ~~(when plywood is required, use pressure preservatively treated plywood).~~ Siding shall not be installed between the structure and the deck band. If attached to a brick structure, neither flashing nor a treated band for the brick structure is required. In addition, the treated deck band shall be constructed in contact with the brick veneer. Flashing shall be installed per Figure AM103.

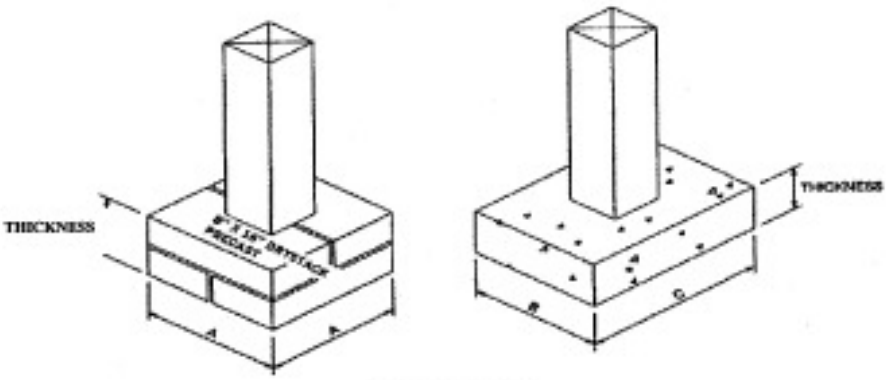


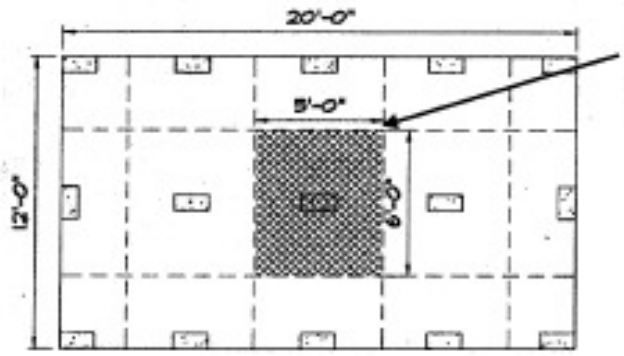
Figure AM102

Table AM102.1

Footing table [a, b, c]

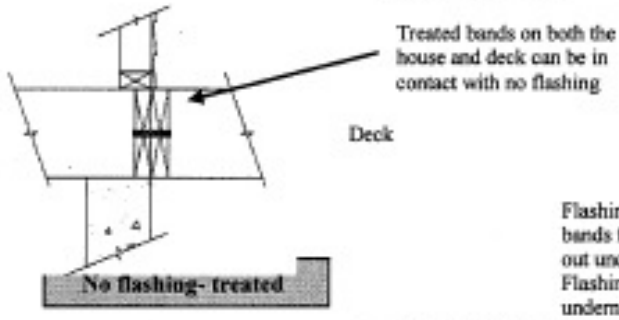
Size (inches)		Tributary Area	Thickness (inches)	
A x A	B x C	(Sq. Ft.)	Precast	Cast-in-place
8 x 16	8 x 16	36	4"	6"
12 x 12	12 x 12	40	4"	6"
16 x 16	16 x 16	70	8"	8"
----	16 x 24	100	--	8"
	24 x 24	150	--	8"

a. Footing values are based on single floor and roof loads
b. Support post must rest in center 1/3 of footer
c. Top of footer shall be level for full bearing support of post



Tributary area of shaded section on free standing deck shown is 5'x6'=30 sq. ft. Code will require a minimum footer of 8"x 16" per Table AM102.1

Figure AM102.1



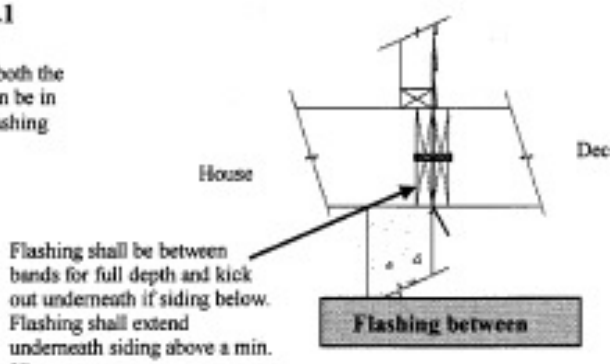


Figure AM1C

Section AM104
Deck attachment

AM104.1 Deck Attachment. When a deck is supported at the structure by attaching the deck to the structure, the following attachment schedules shall apply for attaching the deck band to the structure.

AM104.1.1 All Structures Except Brick veneer Structures:

Fasteners	8' Max Joist Span [a]	16' Max Joist Span [a]
5/8" Hot Dipped Galv. Bolts with nut and washer [b]	1 @ 3'-6" o.c.	~~1 @ 1'-8" o.c.~~ 1 @ 2'-8" o.c.
and	**and**	**and**
12d Common Hot Dipped Galv. Nails [c]	2 @ 8" o.c.	~~3 @ 6" o.c.~~ 3 @ 16" oc

a. Attachment interpolation between 8'&16' joists span are allowed
b. Minimum edge distance for bolts is 2 ½ inches
c. Nails must penetrate the supporting structure band a minimum of 1 ½ inches

AM104.1.2 Brick Veneer Structures

Fasteners	8' Max Joist Span [a]	16' Max joist Span [a]
5/8" Hot Dipped Galv. Bolts with Nut and Washer [b]	1@ 2'-4" o.c.	1@ 1'-4"o.c.

a. Attachment interpolation between 8'&16' is allowed
b. Minimum edge distance for bolts is 2 ½ inches

AM104.1.3 Masonry Ledge Support

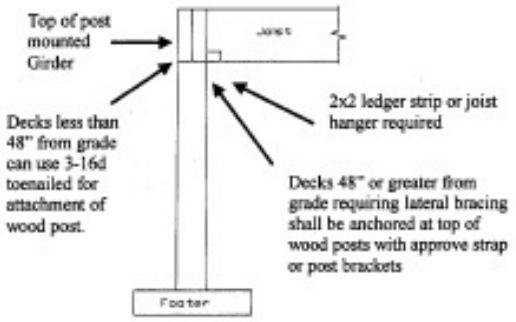
If the deck band is supported by a minimum of ½ inch masonry ledge along the foundation wall, 5/8 inch hot dipped galvanized bolts with washers spaced at 48 inches o.c. may be used for support.

AM104.1.4 Other means of support

Joist hangers or other means of attachment may be connected to house band and shall be properly flashed

Section AM105

AM105.1 Girder Support & Span. Girders shall bear directly on support post with post attached at top to prevent lateral displacement or be connected to the side of posts with two 5/8 inch hot dipped galvanized bolts with nut and washer. Girder spans are per Table R502.5 (1&2). Girder support may be installed per Figure AM105 for top mount; Figure AM105.1 for side mount and Figure AM105.2 for split girder detail. Girders may also be cantilevered off ends of support post no more than 1 joist spacing or 16" whichever is greater per Figure AM105.3.



Top mount/flush

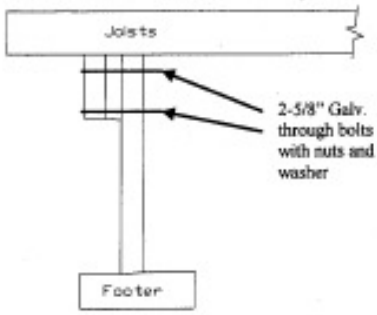
Figure AM105

Section AM106

M106.1 Joist Spans & Cantilevers. Joists spans shall be based upon Table R502.3.1(2) with 40 lbs per sq. ft. live load and 10 lbs per sq. ft. dead load. Floor joists for exterior decks may be cantilevered per Table R502.3.3 (1).

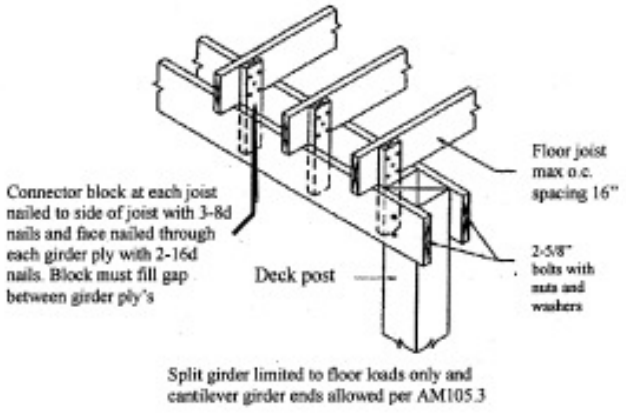
Spacing	2x6	2x8	2x10	2x12
12"	10-9	14-2	18-0	21-9
16"	9-9	12-10	16-1	18-10
19.2"	9-2	12-1	14-8	17-2
24"	8-6	11-0	13-1	15-5

Partial reprint of Table R502.3.1(2) , #2 SYP only joist spans



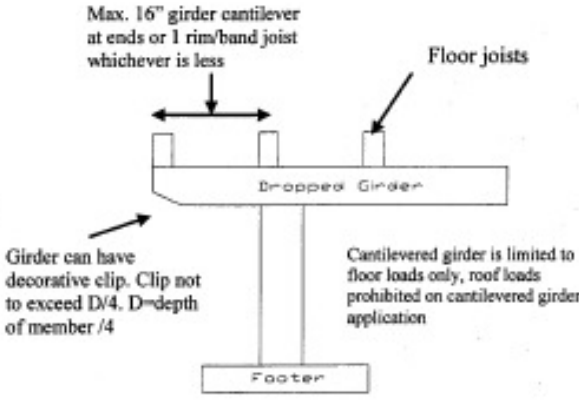
Side mount dropped girder

Figure AM105.1



Split girder detail

Figure AM105.2



Cantilevered dropped girder detail

Figure AM105.3

Section AM107

AM107.1 Floor Decking. Floor decking shall be No. 2 grade treated Southern Pine or equivalent. The minimum floor decking thickness shall be as follows:

Joist Spacing	Decking (nominal)
12" o.c.	1" S4S
16" o.c.	1" T&G
19.2 o.c.	1-1/4" S4S
24"-36" o.c.	2" S4S

Section AM108

AM108.1 Post height. Maximum height of Deck support posts as follows:

Post size [a]	Max. Post Height [b,c]
4x4	8'-0"
6x6	20'-0"

a. This table is based on No. 2 Southern Pine posts.
b. From top of footing to bottom of girder
c. Decks with post heights exceeding these requirements shall be designed by a registered design professional

Section AM109

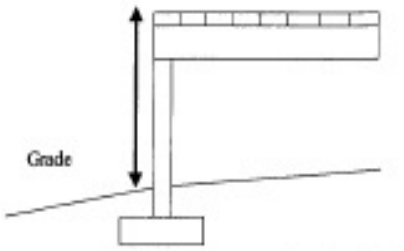
AM109.1 Deck bracing. Decks shall be braced to provide lateral stability. The following are acceptable means to provide lateral stability.

AM109.1.1. When the deck floor height is less than 4'-0" above finished grade per Figure AM109 and the deck is attached to the structure in accordance with Section AM104, lateral bracing is not required.

AM109.1.2. 4x4 wood knee braces may be provided on each column in both directions. The knee braces shall attach to each post at a point not less than 1/3 of the post length from the top of the post, and the braces shall be angled between 45 degrees and 60 degrees from the horizontal. Knee braces shall be bolted to the post and the girder/double band with one 5/8 inch hot dipped galvanized bolt nut and washer at both ends of the brace per Figure AM109.1

AM109.1.3. For freestanding decks without knee braces or diagonal bracing, lateral stability may be provided by embedding the post in accordance with Figure AM109.2 and the following:

Post size	Max. Tributary Area	Max. Post Height	Embedment Depth	Concrete Diameter
4x4	48 SF	4'-0"	2'-6"	1'-0"
6x6	120 SF	6'-0"	3'-6"	1'-8"



Less than 4' (decking to grade) and attached to structure no bracing required

Figure AM109

Freestanding decks requiring bracing shall be installed in both directions off each post

Decks attached to structure require diagonal bracing only at outside girder line parallel with structure

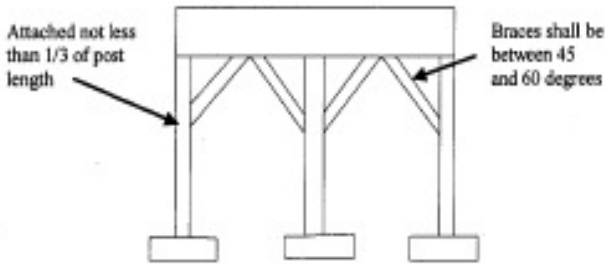


Figure AM109.1

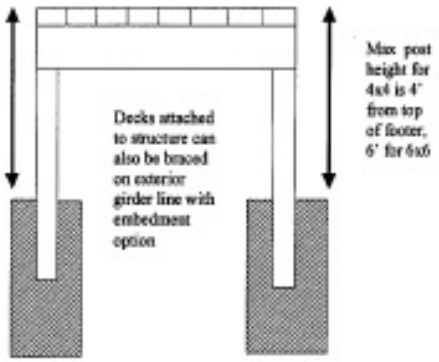


Figure AM109.2

AM109.1.4 2x6 diagonal vertical cross bracing may be provided in two perpendicular directions for freestanding decks or parallel to the structure at the exterior column line for attached decks. The 2x6's shall be attached to the posts with one 5/8 inch hot dipped galvanized bolt with nut and washer at each end of each bracing member per Figure AM109.3.

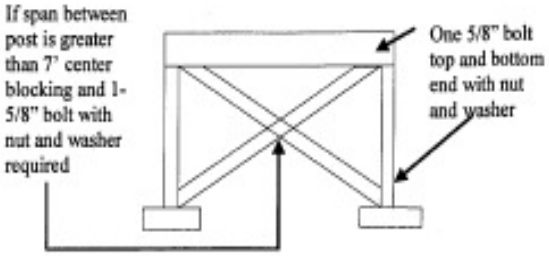


Figure AM109.3

AM109.1.5 For embedment of piles in Coastal Regions, see Chapter 45.

Section AM110

AM110.1 Stairs shall be constructed per Figure AM110. Stringer spans shall be no greater than 7' span between supports. Spacing between stringers shall be based upon decking material used per AM107.1. Each Stringer shall have minimum 3 ½" between step cut and back of stringer. ~~All stringers supported at top on~~ Suspended headers that support stringers at the top shall be attached with 3/8" Galv bolts with nuts and washers.

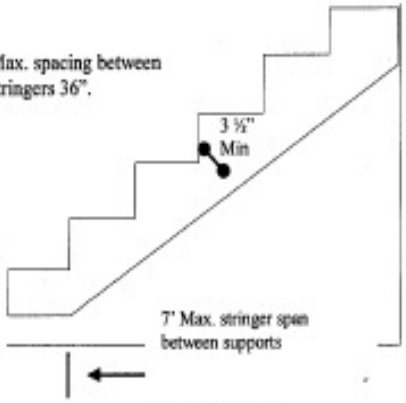


Figure AM110

Section AM111

AM111.1 Handrails, Guards and General. Deck handrails, guards and general construction shall be per Figure AM111.

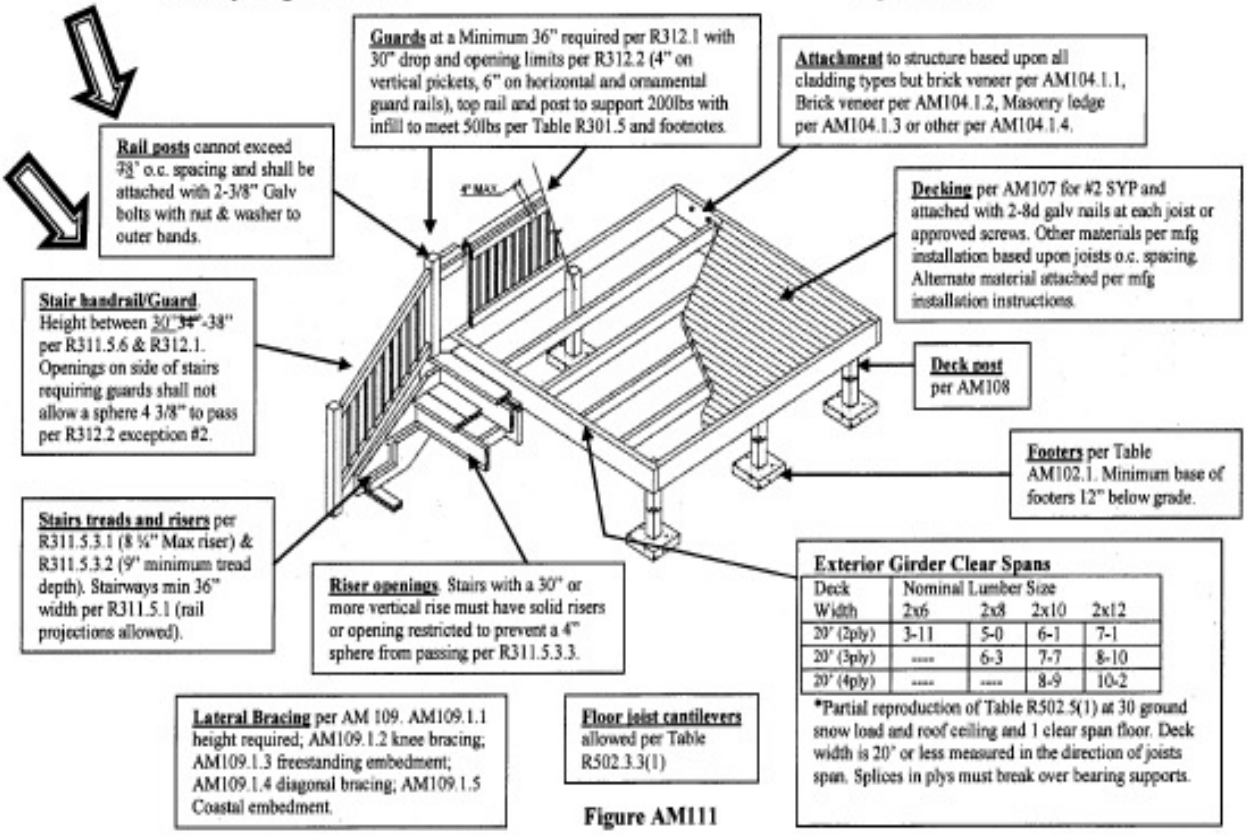


Figure AM111

City of Greenville Zone 3 Residential 2012 Energy Code Requirements – Chapter 11 (3/16/2012)

Quick view of general requirements others may apply, please review chapter 11

Compliance by one of the following N1101.2

- Chapter 11 of the NC residential Code
- NC Energy Code
- Rescheck for NC

Existing buildings-N1101.2 & N1101.3

(additions, alterations, renovations or repairs) Must meet the new code requirements for new work.

Change in space conditioning N1101.2.2

Areas previous not conditioned must meet **all** the requirements of the new code.

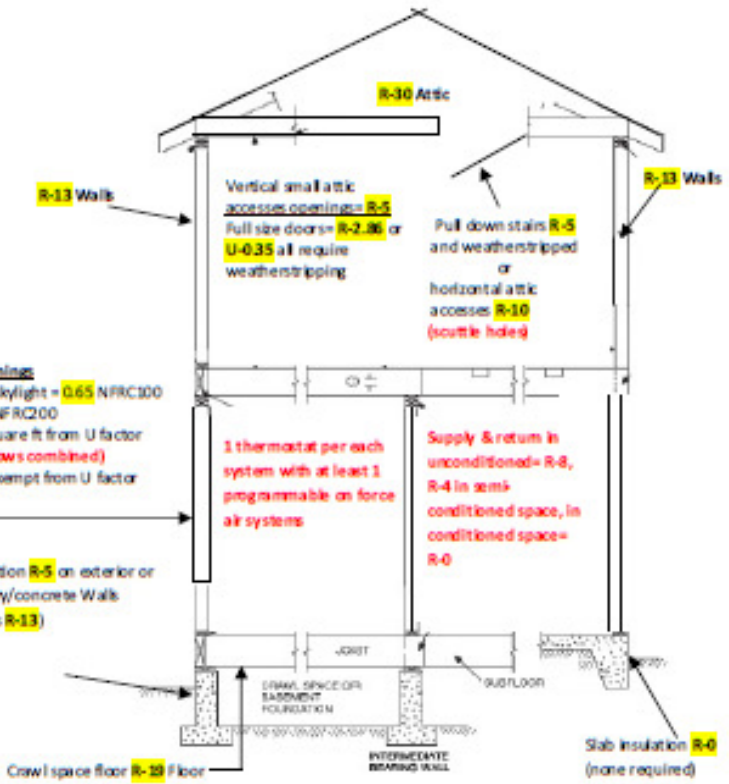
Fenestration air leakage N1102.4.4

0.3 CFM per sq ft for windows, skylights & sliding patio doors. For side hinged doors 0.5CFM per sq ft tested per NFRC400 or AAMA/WDMA/CSA and listed/labeled by Mfg.

Identification N1101.4

Insulation must be labeled if over 12" wide, loose must have depth markers every 300 sq ft in attic with 1" numbers, foam per installer's certification

Energy certificate N1101.9 Has been expanded and is required to be posted in the electrical panel box, by installer's certificate in the attic, kitchen cabinet or other approved location



Site built Fireplaces N1102.4.3 required to have doors to seal firebox.

Sunroom (Thermally isolated conditioned) N1102.2.11 - R-19 in ceiling, R-13 walls, R-30 floors. Fenestration U factor of 0.40, skylight U= 0.75, SHGC all glazing of 0.40

Basement walls N1102.2.7

Have to be insulated to at least 10' below grade.

Opaque door N1102.3.4

Required to be U=0.35 with 1 side hinge door being exempt

Thermal envelope

(N1102.2.12) Framed cavity walls shall have insulation free from ***gaps, voids or compression*** and enclosed on all sides **(all walls must be encapsulated)** per appendix E-2.3 at:

- Tubs, showers, stairs, fireplace units, etc… with rigid or air barrier material

(N1102.4) Durably sealed to limit infiltration

Where the following are present all homes shall be sealed with: caulk, gasketed, weather-stripped, or air barrier/solid material

1. Blocking and sealing floor/ceiling systems and under knee walls open to unconditioned or exterior space.
2. Capping and sealing shafts or chases, including flue shafts.
3. Capping and sealing soffit or dropped ceiling areas.

(N1102.4.2) Air sealing has ***2 options*** available either self certification or blower door testing.

1-Self certify per checklist in appendix E-1, table N1102.4.2 includes:

- Top plate to ceiling or wall drywall
- Top plate penetrations
- Sill plate sealed w/caulk or gaskets
- Window/door jamb perimeter seal
- Air barrier at any exposed edge at floors
- Penetrations through thermal barrier like electrical, plumbing, security, etc…
- Air barrier above garage ceiling at separation line
- Duct boots sealed to subfloor or drywall
- Recessed lights IC and sealed

2-Blower door test per N1102.4.2.2 (fill out certificate listed in N1101.9) equal to or less than one of two performance measurements:

1. 0.30 CFM50/Square foot of surface area (SFSA)
2. 5 air changes per hour (ACH50)